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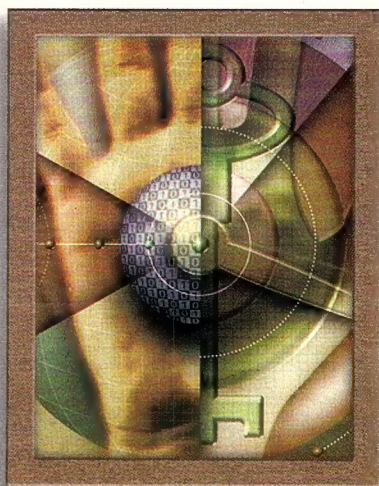
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October 1998

The
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Internet sites. This page also features more than 100 hypertext links to shareware/freeware utilities. *NetWare Connection* also rates the utilities according to performance and usefulness. Be sure to check out the "Utilities of the Month" section where we post our favorite new discoveries. ●

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Tom White

NetWare Connection, October Issue,
Volume 9, Number 9

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LETTERS TO THE EDITOR

Backing Up

Mickey Applebaum's article "Backing Up NDS" (*NetWare Connection*, Aug. 1998, pp. 43-45) explained how to back up Novell Directory Services (NDS) information with backup software run from the server. Because of the inherent problems associated with having the backup system attached to a device that might fail, I have never been a fan of this strategy. Attaching the backup system on a workstation avoids numerous problems but has its own weaknesses.

How would you recommend backing up NDS with a workstation-based backup system? Can the information be dumped to a file that can be backed up (and restored, if necessary)?

Martin Forbes

You cannot back up NDS from a workstation because workstations cannot support server-based Storage Management Services (SMS) functions, which are required to back up NDS. You can set up a standalone, run-time server (two-user license) or a five-user server as the backup station. However, the inherent problems of backing up across the wire (including lost or dropped data, lost communication links, and performance problems) do not make this solution a reliable means of backing up.

The only exception is if you are backing up five or more servers to one computer that holds multiple tape drives and you are running data streams concurrently to different devices. In this case, the cost savings versus the potential problems changes the balance.

Mickey Applebaum, author

Good Work!

I just wanted to take a moment to say what a pleasure it is to read *NetWare Connection*. The articles are consistently clear and informative, providing timely information in a concise way. If only all publications were this enjoyable!

Keep up the good work.

Ben Price

I would like to commend you for your excellent overview of the changes that are taking place in the computer industry and their implications for the future. "Service Location Protocol: Discovering Services in a Pure IP Environment" by Laura Chappell in particular was concise and excellent (*NetWare Connection*, July 1998, pp. 32-37).

Keep up the good work!

Jimmy Castro

Clarification

In the September issue, "Novell News" featured an agreement between Novell and Eicon Technology (*NetWare Connection*, p. 43). Unfortunately, our report may have been misleading. As a result of this agreement, Eicon Technology's WAN adapters, EiconCard P62 for NetWare, and EiconCard P92 for NetWare are listed in the Third-Party Solutions section of Novell's Price List. (The product code for EiconCard P62 for NetWare is 310-246, and the product code for EiconCard P92 for NetWare is 310-247.) In addition, Eicon Technology is authorized to use the Novell red box brand to sell these WAN adapters.

To support these WAN adapters, Novell has included the WAN drivers with NetWare 5. However, the WAN adapters themselves are sold separately.

For more information about EiconCard P62 for NetWare and EiconCard P92 for NetWare, visit Eicon Technology's World-Wide Web site at <http://www.eicon.com>. ●

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BorderManager 3.0

Patrolling the Borders of Your Network

Linda Boyer

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When *NetWare Connection* introduced you to Novell's BorderManager 18 months ago, the term *border* was relatively new in the networking industry. Now this term is widely used to refer to the points at which a network meets another network. External borders, such as the border between your company's network and the Internet, are typically secured with a firewall to guard against hacker attacks—that is, attacks launched by unauthorized users.

Interestingly, hacker attacks are not as common as insider attacks, which involve trusted, authorized users. In fact, the 1998 Annual Industry Survey conducted by *Information Security* reveals that employee access abuses are one of the most common security breaches (second only to viruses). Specifically, 54 percent of companies that participated in the 1998 Annual Industry Survey experienced a security breach involving an employee, while only 12 percent of these companies experienced a hacker attack. (*Information Security* is the official publication of the International Computer Security Association, or ICSA, formerly known as the NCSA. To read the 1998 Annual Industry Survey, go to <http://www.icsa.net/magazine>, and select the June 1998 option from the Archived Articles menu.)

You can reduce the chances of experiencing an insider attack by strengthening security on the internal borders between your company's departmental networks. And you can use BorderManager 3.0 to help you do the job. (For more information about protecting internal borders, see "Keep the Home Mini-Firewalls Burning" on p. 14.) BorderManager 3.0 is the latest version of BorderManager, the only integrated family of directory-based network services that centrally manages, secures, and accelerates users' access to information at every network border—internal and external alike.

As with previous versions of BorderManager, BorderManager 3.0 enables you to implement mini-firewalls at departmental borders. Naturally, you can also use BorderManager 3.0 to secure your company's Internet border.

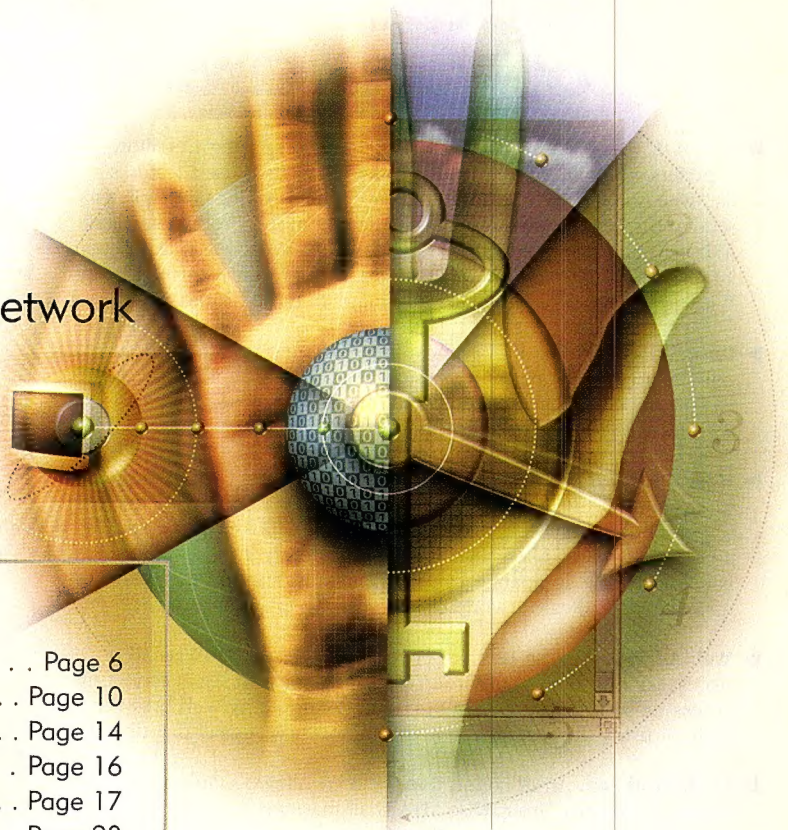
Furthermore, because BorderManager 3.0 remains fully integrated with Novell Directory Services (NDS), you can easily control users' access through these borders. For example, by using the BorderManager snap-in module for Novell's NetWare Administrator (NWADMIN) utility, you can control where users go on your company's network or the Internet, when they can go there, and what level of access they have once they get there. You can also control when and which users can access your company's network from the Internet.

Of course, you could use any version of BorderManager to secure internal and external borders. So what's new in BorderManager 3.0? In short, BorderManager 3.0 is the same, only better. BorderManager 3.0 is faster, more secure, and more convenient to manage than previous versions of BorderManager. With BorderManager 3.0, Novell has enhanced BorderManager's three strong suits: performance, security, and management.

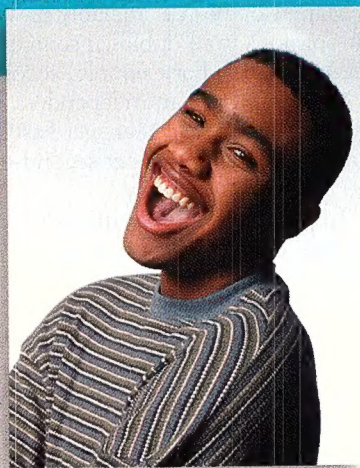
HTTP AND FTP—YOU'LL WANT THAT IN CACHE

Although BorderManager has many valuable features, it is perhaps best known for BorderManager FastCache, Novell's proxy cache. In fact, today more than four million users use BorderManager FastCache to speed users' access to the Internet or an intranet, to accelerate a World-Wide Web site, and to reduce network bandwidth requirements.

Previous versions of BorderManager offered only an HTTP proxy cache and an HTTP accelerator, which you can use to



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store pages requested from HTTP, FTP, or Gopher servers. Using a feature called *normal caching*, or *passive caching*, the HTTP proxy cache allows you to store pages that internal users request from external web sites (such as web sites on the Internet). Using a feature called *acceleration*, or *reverse caching*, the HTTP accelerator allows you to store pages that external users request from internal web sites (that is, web sites on your company's intranet).

In addition to the HTTP proxy cache and the HTTP accelerator, BorderManager 3.0 now includes an FTP proxy cache and an FTP accelerator. As a result, BorderManager 3.0 performs FTP caching when users are accessing FTP through a native FTP application. Because previous versions of BorderManager included only an HTTP proxy cache and an HTTP accelerator, these versions performed FTP caching only when users accessed FTP through a web browser.

You can use the BorderManager snap-in module for the NWADMIN utility to

set caching options for the HTTP and FTP proxy caches and for the HTTP and FTP accelerator. (See Figure 1 on p. 10.) The passive and reverse caching options are the same for HTTP and FTP. For example, you can configure the following options:

- The location of the cache
- The maximum size of pages stored in cache
- The number of minutes, hours, or days BorderManager 3.0 should wait before retrieving a page again from the original web site
- Pages you do not want to cache

Fetch!

All of these options allow you to customize BorderManager FastCache for your company's network and make BorderManager FastCache fast. But just how fast can BorderManager FastCache be? In a keynote address at BrainShare '98 in Salt Lake City, Drew Major, Novell's chief scientist and vice president of advanced development, claimed that

BorderManager FastCache is capable of processing more than 5,000 hits per second when configured to run from RAM (as opposed to running from the hard drive). BorderManager FastCache, according to Major, is 5 to 10 percent faster than other proxy servers also configured to run from RAM. (You can view a video of Major's keynote address at <http://www.novell.com/webcast/98/bs98/index.html#major>.)

Major's opinion is arguably biased, but opinions from unbiased sources are notably similar. For example, according to Mindcraft Inc., an independent testing company, BorderManager FastCache can process 4,055 hits per second—that's 350 million hits per day.

To place 350 million hits per day in context, consider this: In a recent *PC Week* article entitled "Microsoft.com's Poor Performance Frustrates Users," author Norvin Leach implies that Microsoft has acknowledged its web site is sluggish. According to Leach, Microsoft "attributes the problems partly to skyrocketing usage, which officials are estimating at 88 million hits per day." (See *PC Week*, June 30, 1997. You can download this article from <http://www.zdnet.com/pcweek/archive/1428/pcwk0118.html>.)

If Leach's claim is true, Microsoft's excuse for its web site's poor performance is both revealing and weak. The excuse is revealing because it implies that Microsoft's own proxy cache technology is not up to the task of supporting www.microsoft.com. And the excuse is weak because BorderManager FastCache can efficiently process nearly four times the number of hits per day that are apparently slowing Microsoft's web site.

In BorderManager 3.0, BorderManager FastCache is even faster. BorderManager 3.0 now offers two additional options for HTTP and FTP caching that speed the caching process:

- Read-ahead caching
- Scheduled batch downloads

Read-Ahead Caching

Read-ahead caching, also called *active caching*, is intelligent caching. That is, with read-ahead caching, the proxy cache makes intelligent assumptions about what the web browser will request next, such as images on a page. The

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proxy cache automatically requests what it assumes the web browser will request—and makes that request without waiting for further instructions from the web browser.

How important are read-ahead capabilities? A proxy cache without read-ahead capabilities will not retrieve an object unless the web browser explicitly requests the object—no matter how obvious it is that the web browser will request that object next. For example, when a web browser requests a particular URL, the proxy retrieves the page and stores it in cache. This page most likely includes path names to embedded objects (such as images) that the web browser will almost certainly request next.

However, a proxy cache without read-ahead capabilities does not anticipate the next request that a web browser will make. Instead, this type of proxy cache waits for the web browser to open the page and to send separate requests for embedded objects on that page.

Of course, a proxy cache with read-ahead capabilities makes this retrieval process quite a bit faster. For example, when a web browser requests a particular URL, a proxy cache with read-ahead capabilities retrieves the page and, upon finding path names to embedded objects, retrieves these objects as well.

When the web browser opens the page and sends separate requests for embedded images, the proxy cache with read-ahead capabilities has already retrieved these objects. Thus, the embedded objects are stored in cache, ready to be sent to the web browser in an instant.

In BorderManager 3.0, you enable read-ahead caching on the Cache Control screen, which you can access by clicking the Caching button on either the Acceleration screen or the Proxy Cache screen in the NWADMIN utility. (See Figure 1 on p. 10.) BorderManager 3.0 offers two read-ahead caching options, in addition to the option of disabling read-ahead caching:

- Read-ahead images embedded in the page
- Maximum number of concurrent read-ahead requests

When you select the first option, BorderManager FastCache retrieves embedded objects on a requested page without waiting for the web browser to request these objects.

You can also specify the maximum number of concurrent read-ahead requests, which limit the number of embedded images that BorderManager can retrieve at one time. In this way, you can prevent the proxy cache from becoming overburdened.

Scheduled Batch Downloads

BorderManager 3.0 also offers scheduled batch downloads for the HTTP proxy cache and the HTTP accelerator. Scheduled batch download capabilities, like read-ahead caching capabilities, make BorderManager FastCache even faster.

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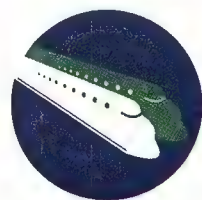
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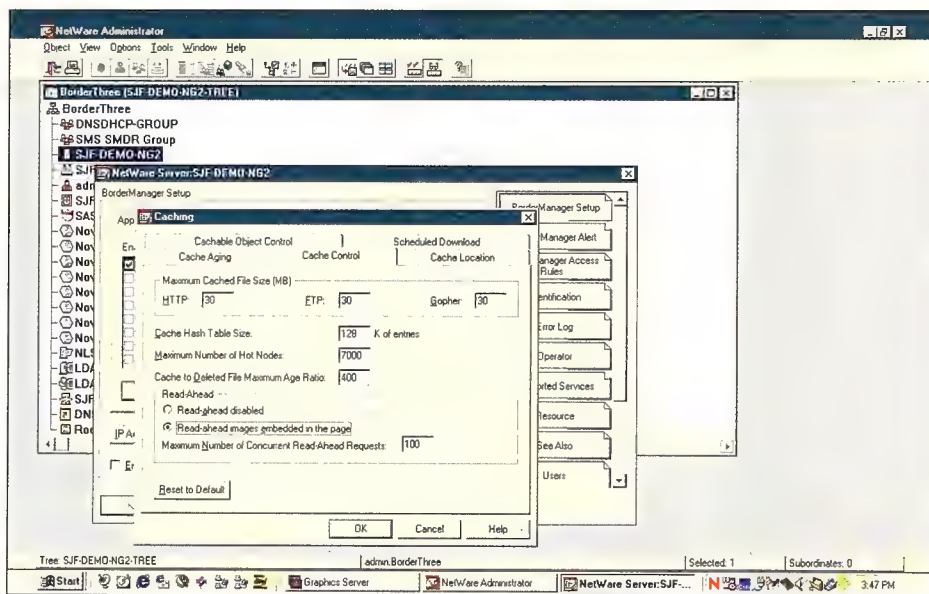


Figure 1. You can use the snap-in module for the NWADMIN utility to set caching options for BorderManager 3.0 servers.

Scheduled batch download capabilities allow you to download particular URLs when network utilization is low. You can use scheduled batch downloads to download frequently accessed web sites, so BorderManager FastCache is always current and contains the web sites that users request most often.

In addition, BorderManager 3.0 allows you to specify the frequency of scheduled batch downloads. For example, you can specify that you want a particular download to occur once only, once a day, on particular days of the week, or during the hours you specify. For each URL you want to download at a scheduled time, you can also indicate how many levels deep BorderManager FastCache should go—that is, how many embedded images BorderManager FastCache should retrieve and store.

TIGHTENING UP SECURITY AT THE BORDER

Although BorderManager provides caching, it is much more than a proxy server. BorderManager also offers several firewall security features. All versions of BorderManager are well-fortified with security features, including network address translation (NAT), packet filtering, the Novell IP gateway, and the HTTP application proxy. With BorderManager 3.0, Novell has enhanced nearly all of these security features and has added a new one: alerts delivered via

Simple Mail Transfer Protocol (SMTP) or Simple Network Management Protocol (SNMP).

Many customers who used previous versions of BorderManager reported the need for alerts. In fact, Patrick Harr, a product manager at Novell, says that Novell "received a lot of feedback about including an alert mechanism as a core feature." As a result, Harr explains, Novell built alerts into BorderManager 3.0, which can now alert you to particular security violations, including various denial-of-service attacks and the Ping of Death.

The Ping of Death is notorious for bringing down Microsoft's web site in June 1997. The Ping of Death refers to an attack that involves sending an unusually large ping packet—larger than 65,536 bytes—from a remote computer to a server. A ping packet, which is typically about 65 bytes, contains an Echo message. Generally, a server or a client uses Internet Control Message Protocol (ICMP) to "ping" another server or client to check the performance of that server or client. Because many systems cannot handle an unusually large ping packet, they often crash or reboot when faced with one—just as Microsoft's web site did.

To prevent the Ping of Death from wreaking havoc on your company's network, BorderManager 3.0 warns you when a server has been hit by the Ping of Death or by other types of attacks.

You can then respond immediately to attacks that threaten to bring down the network.

You enable alerting by using the BorderManager snap-in module for the NWADMIN utility. You can then specify whether you want BorderManager 3.0 to alert only you or to alert other people whom you specify as well. In addition, you can indicate whether you want the alerts delivered by way of an e-mail message (using an SMTP gateway), by way of a pager (using an e-mail-to-pager gateway), or by way of messages sent through an SNMP-compliant management application, such as Novell's ManageWise.

CREATING SECURE RETURN PATHS

In addition to adding alerting capabilities, Novell made several enhancements to the security features available in BorderManager 3.0. For example, Novell enhanced the following security features:

- The packet-filtering firewall
- The circuit-level gateway
- The application-level gateway

All versions of BorderManager provide a packet-filtering firewall, which allows you to filter TCP/IP packets based on source and destination address, port number, and protocol. BorderManager 3.0, however, includes two new filters. Using Novell's familiar FILTCFG utility, which is included with BorderManager 3.0, you can enable the following filters:

- Stateful filters
- ACK bit filters

State of Security

Stateful filters automatically create return paths for outbound packets, enabling internal users to communicate with the outside world while preventing unwanted outsiders from initiating sessions with these users. When you enable a stateful filter, BorderManager 3.0 automatically creates a return path for traffic flowing from the source port number and address you specify to the destination port number and address you specify. You can then block traffic originating from a particular port number and address while still allowing return traffic from that same port number and address.

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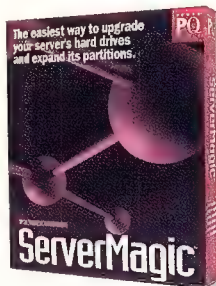
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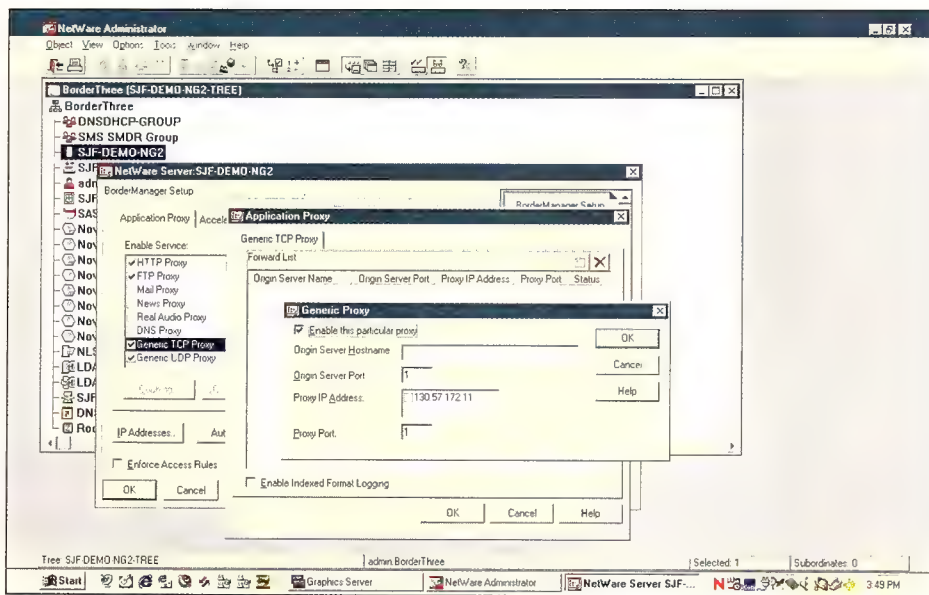


Figure 2. You can use generic application proxies to create your own proxies for a TCP or UDP application.

Stephen Wu, an engineer at Novell, explains stateful filters by using the following example: Suppose that you wanted to allow users to access external FTP servers but you wanted to block FTP traffic originating from an external source. Enabling a stateful filter for a dynamic port range on your private network interface board and the FTP port (21) on your public network interface board would do the trick.

To enable a stateful filter, you would use the FILTCFG utility to specify the source and destination interfaces, the packet type, and the source and destination port numbers and IP addresses to which this filter should apply. You would then simply choose to enable the Stateful Filter option. The example below shows the information you would specify:

```
Src Interface
Dest Interface
Packet Type
Src Port
Dest Port
Src Address
Dest Address
ACK Bit Filter
Stateful Filter
Private
Public
TCP
1024-65535
21
Any
```

```
Any
Disable
Enable
```

In previous versions of BorderManager, you could configure static filters to filter inbound traffic originating from external sources. Admittedly, static filters are a bit faster than stateful filters. However, Wu explains, there are two advantages to using stateful filters rather than static filters to screen traffic originating from external sources. One advantage is that a stateful filter is inherently more secure than a static filter because there is less chance for human error in configuring a stateful filter than in configuring a static one.

Why? In order to use a static filter to filter inbound traffic originating from an external source, you would have to configure a total of six filters: two for the control channel, two for the PORT data channel, and two for the PASV command data channel. In contrast, to use a stateful filter, you need to configure only one filter. The convenience of enabling one filter versus six filters is the second advantage to using a stateful filter.

Don't Let 'Em In Without ACK

ACK bit filters (sometimes called SYN bit filters) ensure that only TCP packets containing the ACK bit set can pass through the firewall. To better understand how an ACK bit

filter works, you must first understand the handshaking that servers and clients use when they establish TCP sessions. This handshaking involves an exchange of TCP packets containing SYN (synchronize) bits and ACK (acknowledge) bits.

The first packet in a TCP session contains the SYN bit set and indicates a request to open a session. The return packet contains the ACK bit set, acknowledging the receipt of the initial SYN packet. This return packet also contains a SYN bit set, indicating the recipient server's willingness to synchronize (that is, establish) a session with the requesting client.

For example, suppose that a client on your company's network tried to establish a session with an external server. The handshaking between the server and the client would occur as follows:

- Client A would initiate a session with server B by sending a SYN(a) packet to server B.
- Server B would respond by sending an ACK(a) packet, along with a SYN(b) packet, to Client A.
- Client A would finish the handshaking with an ACK(b) response to server B.

Now suppose that you wanted to allow users to access external Telnet servers. To allow Telnet clients to connect to Telnet servers, you could configure a filter. This filter would allow outgoing packets from a dynamic port range on your private network interface board, such as 1025-65535, to access port 23 (the port Telnet services typically use) on your public network interface board.

You would also need to configure a filter that would allow incoming packets from port 23 to access dynamic port range 1025-65535. However, as Jayakumar Ramalingam, an engineer at Novell, explains, configuring such filters creates a "hole because a bad guy could use port 23 as a source port to connect to services available in the dynamic port range on your private network interface board."

You can plug such holes by enabling an ACK bit filter when you create the filter to allow incoming packets from port 23 bound for the dynamic port range 1025-65535. If you enable an

ACK bit filter in this situation, incoming packets from port 23 on the public interface board would be able to access the dynamic port range 1025-65535 only if these packets contained the ACK bit set. In other words, port 23 could not be used to initiate TCP sessions using the specified port range because packets that initiate TCP sessions contain only SYN bits—they don't contain ACK bits.

In short, an ACK bit filter prevents incoming packets without ACK bits from entering your company's network. As a result, internal users can initiate TCP sessions with the outside world, but the outside world cannot initiate TCP sessions with internal servers or clients.

Using an ACK bit filter protects your company's network from common attacks, such as SYN flooding attacks. A SYN flooding attack is a denial-of-service attack that a "bad guy" initiates by overloading your network with SYN-flagged packets and effectively locking out legitimate session requests for TCP sessions.

MORE CLIENTS, LESS WORK

Novell didn't stop at enhancing its packet-filtering firewall, however. When creating BorderManager 3.0, Novell also enhanced its circuit-level gateway, the Novell IP gateway. (For more information about circuit-level gateways, see "Great Walls of Fire," *NetWare Connection*, Jan. 1997, pp. 6-28. You can download this article from <http://www.nwconnection.com/jan.97/fire17.>)

The Novell IP gateway in BorderManager 3.0 and in previous versions of BorderManager consists of two components: an IPX-to-IP gateway and an IP-to-IP gateway. In previous versions of BorderManager, the Novell IP gateway enabled Windows 95 clients using IPX or IP to access the Internet without requiring you to assign a specific IP address to each workstation. (For more information on the Novell IP gateway, see "Novell's Border Services," May 1997, *NetWare Connection*, pp. 25-36. You can download this article from <http://www.nwconnection.com/may.97/border57.>) BorderManager 3.0 extends this support

to Windows 98 clients and Windows NT servers and clients.

If you are already using BorderManager, you might be thinking that supporting additional clients means additional work. But that is not the case. Unlike previous versions of BorderManager, BorderManager 3.0 supports WINSOCK 2.0. As a result, you no longer have to replace the WINSOCK software running on Windows clients with Novell's own WINSOCK software. The Novell IP gateway in BorderManager 3.0 supports the WINSOCK software that is already running on Windows clients.

PROXY PATROL

BorderManager has always included an HTTP proxy, which is an application-level gateway. An application-level gateway provides the highest level of firewall security available, enabling you to control not only which ports and addresses users can access but also which files they can access using these ports and addresses. (For more information about

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Keep the Home Mini-Firewalls Burning

Few companies would consider attaching their corporate World-Wide Web sites to the Internet without first setting up firewalls for protection. Yet most companies feel perfectly comfortable leaving their internal web sites unprotected. Most companies seem to be under the impression that they are safe within their private networks. After all, they have installed firewalls to protect themselves from what they perceive as the real threat: attacks from outsiders. However, this perception is far from the truth.

The truth is that you would be better off leaving your Internet connections unprotected than leaving your internal web sites unprotected. According to the International Computer Security Association (ICSA), more than 80 percent of all security breaches involving someone gaining unauthorized access to information occur inside of firewall-protected borders. (See *Firewall Buyer's Guide* at <http://www.icsa.net>.)

The implication of this statistic is quite clear: You really need to protect your internal web sites. You need to set up mini-firewalls to protect your internal borders. BorderManager 3.0 is well-suited for the job of protecting internal borders.

WRAP YOUR INTERNAL WEB SERVERS

Novell recommends that you use BorderManager 3.0 as a "security wrapper" around your internal web servers. One way to create a security wrapper would be to place your internal web servers on a separate network segment and install a BorderManager 3.0 server in front of that segment. All traffic to and from those web servers would filter through the BorderManager 3.0 server.

To control access to the web servers, you could use the BorderManager snap-in module for the NetWare Administrator (NWADMIN) utility. Using this utility, you could grant users the necessary rights to access information on particular web servers. You could grant rights to Organization, Organizational Unit, Group, or User objects. Then only users to whom you had granted explicit rights could access the information on those web servers.

Using BorderManager 3.0 to protect your company's internal web servers enables you to make better use of those servers. You would no longer be limited to posting only information that anyone could access. Instead, you could post information that only certain users should access.

For example, you could post sensitive information such as designs for next year's products, payroll information, or your company's financial reports. You could post anything because using BorderManager ensures that the information you post is secure.

LEAVE IT TO NOVELL DIRECTORY SERVICES

In addition, by using BorderManager to control users' access to your internal web servers, you ensure that users lose rights to access those web servers the moment their Novell Directory Services

(NDS) accounts are disabled. For example, suppose your company had several web servers, which were installed on a separate network segment. Also suppose you were front-ending that network segment with a BorderManager 3.0 server. If an employee were fired, you could simply disable this employee's Novell Directory Services (NDS) account, and he or she would immediately lose access to the BorderManager server and, therefore, to the protected network segment.

SUPPLY THE SPEED YOUR USERS NEED

If you use BorderManager to front-end your web servers, you can do more than secure access to those servers. You can also accelerate access to those web servers. For example, during a keynote address at BrainShare '98 in Salt Lake City, Drew Major, Novell's chief scientist and vice president of advanced development, invited Kent Anderson, director of Novell IS&T, on stage to explain how Novell uses BorderManager.

Anderson first discussed how Novell uses BorderManager to accelerate access at the company's Internet border. Anderson claimed that during the seven months preceding BrainShare '98, Novell had experienced a 400 percent increase in Internet web traffic. According to Anderson, the BorderManager servers that Novell had installed had easily handled this increase.

In addition, Anderson explained that Novell had enabled reverse caching on the BorderManager servers. By having BorderManager servers store information external users requested from internal web servers in cache, Novell hoped to reduce actual traffic on the internal web servers.

In fact, Anderson said, the BorderManager servers reduced the actual traffic on Novell web servers by 80 percent. "And do you know what that means?" Anderson asked Major. "I have saved internally over U.S. \$200,000 in hardware upgrades because I'm still able to use the same web servers I bought over a year and a half ago."

Although Major was understandably impressed with Anderson's report on how Novell was using BorderManager to protect and improve performance at external borders, he was more interested in hearing about how Novell was using BorderManager to protect internal borders. Anderson explained that Novell essentially used BorderManager on internal borders in the same way it used BorderManager on external borders—that is, to secure and accelerate access.

Novell has a cluster of internal web servers collectively called *InnerWeb*. Novell front-ends InnerWeb with several BorderManager servers, which according to Anderson, has reduced actual traffic on InnerWeb by 50 to 60 percent. In addition, Anderson explained, "By using BorderManager in front of our web servers, I'm able to post really confidential information out there." Posting confidential information is now possible because that information is safe behind the BorderManager firewall on the internal border. ●

application-level gateways, see "Great Walls of Fire," *NetWare Connection*.)

All versions of BorderManager include the HTTP proxy to provide this degree of control. However, only BorderManager 3.0 offers the transparent HTTP proxy.

In previous versions of BorderManager, you had to configure each workstation's web browser to ensure those web browsers used the HTTP proxy. In contrast, the transparent HTTP proxy included in BorderManager 3.0 allows web browsers to use the HTTP proxy without

requiring you to configure these browsers on individual workstations. You don't have to configure web browsers on workstations running Novell's 32-bit client software, and you don't have to configure web browsers on workstations that are not running this client software.

All Internet-bound traffic from workstations running Novell's 32-bit client software flows through the BorderManager server. When the TCP/IP stack on the BorderManager server receives this traffic and finds that it is bound for port 80 (the port HTTP services typically use), the TCP/IP stack redirects that traffic to the HTTP proxy on the same server.

For workstations that are not running Novell's 32-bit client software, you do have to do some configuring—but not on hundreds of individual workstations. Instead, you configure your internal router or switch to direct all Internet-bound traffic from workstations that are not running Novell's 32-bit client software to the BorderManager server. By doing so, you ensure that users at these workstations who try to access HTTP services do so “transparently.” The internal router or switch routes HTTP traffic from these workstations to the BorderManager server. In addition, when the TCP/IP stack on the BorderManager server receives traffic bound for port 80 from workstations not running the 32-bit client software, the TCP/IP stack redirects that traffic to the HTTP proxy.

More Proxies, More Security, More Control

The bad news is you must configure applications on individual workstations to use the other proxies available in BorderManager 3.0. Which brings us to the good news: BorderManager 3.0 includes seven new application proxies, in addition to the HTTP proxy:

- An FTP proxy
- An SMTP/Post Office Protocol 3 (POP3) proxy
- A Network News Transfer Protocol (NNTP) proxy
- A Domain Naming System (DNS) proxy
- A Real Audio/Real Video proxy
- A generic TCP proxy
- A generic User Datagram Protocol (UDP) proxy

The generic TCP proxy and the generic UDP proxy allow you to create your own proxies for any TCP or UDP applications for which BorderManager 3.0 does not yet provide a specific proxy. These generic application proxies enable you to route applications through the BorderManager 3.0 server, so you don't

have to configure packet filters for these applications. For example, you might want to create a proxy for the Telnet server on your company's network. (See Figure 2 on p. 12.)

As with all proxies, a proxy for this Telnet server would ensure that there was never direct communication between Telnet clients and the Telnet server. Telnet clients would communicate

only with the BorderManager server, and the Telnet proxy on that server would relay messages between the Telnet clients and the Telnet server. Although Telnet clients would be communicating through the Telnet proxy, it would appear to these clients that they were communicating directly with the Telnet server. That's the beauty of application proxies.



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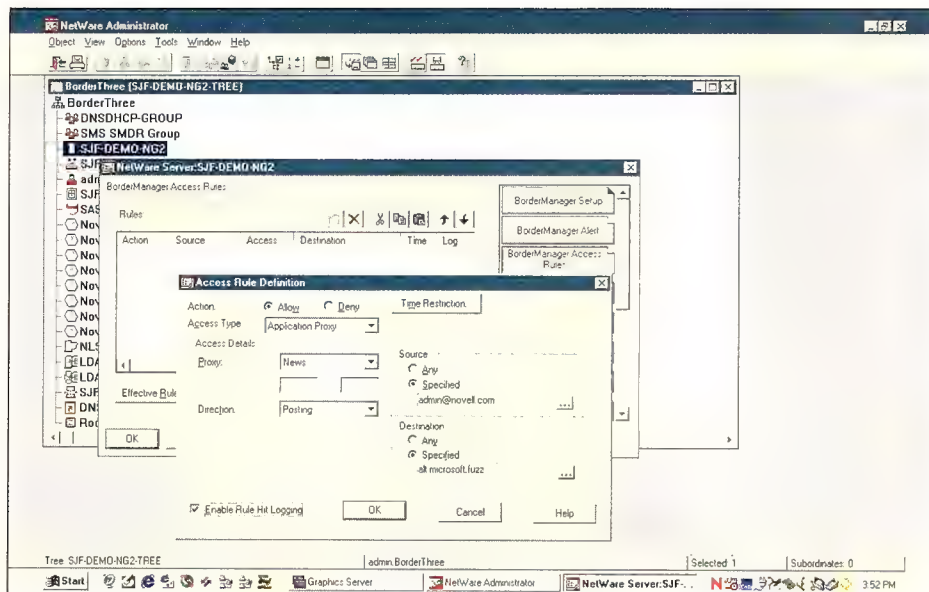


Figure 3. You can use the snap-in module for the NWADMIN utility to control users' access to application proxies.

You can configure specific access controls for each of the new application proxies included in BorderManager 3.0. Naturally, all of the access controls previously available for the HTTP proxy are still available in BorderManager 3.0. (See Figure 3.) You can control users' access to the application proxies (including the proxies you create using the generic TCP or UDP proxy) based on one or all of the following options:

- Days of the week
- Times of the day
- Source information, which can be NDS objects, DNS host names, host addresses, or subnet addresses
- Destination addresses, which can be specific URLs

In addition, for many of the new application proxies, including the SMTP/POP3 proxy and the NNTP proxy, you can configure specific access controls. For example, for the SMTP/POP3 proxy, you can screen packets based on the source or destination e-mail username or domain name. And for the NNTP proxy, you can screen packets based on the name of the destination news group.

INTERFACE LIFT

I have already mentioned several of the management conveniences provided by BorderManager 3.0: the support for WINSOCK 2.0, which eliminates the need to replace the WINSOCK software

on Windows clients; the transparent HTTP proxy, which eliminates the need to configure web browsers on individual workstations; and the BorderManager snap-in module for the NWADMIN utility, which you can use to manage most BorderManager features (including protocol gateways, application proxies, and access control rules).

In previous versions of BorderManager, you had to run the BorderManager snap-in module for the NWADMIN utility on a Windows 95 workstation. Support for Windows 98 and Windows NT was available, but only as a patch. The snap-in module for BorderManager 3.0, however, supports Windows NT, Windows 98, and Windows 95 out of the box, so you can use whichever platform you prefer.

As you might expect, Novell has changed the screens in the snap-in module for BorderManager 3.0, primarily to accommodate new BorderManager features. For example, in previous versions of BorderManager, you were able to access all of the screens that would enable you to perform management tasks by clicking the Setup button from the Details page for the BorderManager Server object. In BorderManager 3.0, the BorderManager Server object offers two new details, in addition to the BorderManager Setup detail:

- BorderManager Alert, which you use to enable alerts

- BorderManager Access Rules, which you use to configure all outgoing rules

The BorderManager Alert detail is entirely new to BorderManager 3.0. The BorderManager Setup detail and the BorderManager Access Rules detail are modified versions of screens you have seen before.

Novell also enhanced the logs in BorderManager 3.0. In previous versions of BorderManager, you could view service logs only through the NWADMIN utility, and you could not print these logs. The only exceptions to these restrictions were the logs for the HTTP proxy. BorderManager 3.0, on the other hand, allows you to export all log files to a text file, which you can then import into a spreadsheet or word-processing application to view and print.

You can combine these log files into one text file, or you can create a separate text file for each service. And if you are using the HTTP accelerator for multiple web sites, you can create a separate text file for each web site. For example, an Internet service provider (ISP) hosting multiple web sites could provide each customer with a customized log.

To create reports that are even easier to read, you can import the log text files into WebTrends, a log analysis tool from WebTrends Corp. WebTrends produces graphical reports and charts.

BorderManager 3.0 includes another more noticeable, interface-related change as well: BorderManager 3.0 offers a new Java-based GUI installation utility. This wizard-driven utility is similar to the Java-based GUI installation utility shipping with NetWare 5. (For more information about the Java-based GUI installation utility, see "Installing NetWare 5 With a Graphical Utility," *NetWare Connection*, Sept. 1998, pp. 12-19. You can download this article from <http://www.nwconnection.com/sep.98/install98>.) This fact should come as no surprise to you, once you learn that NetWare 5 is the default operating system for BorderManager 3.0. BorderManager 3.0 even includes a two-user version of NetWare 5.

The user-friendly installation utility included with BorderManager 3.0 was designed to make installation easy—even for users who have never installed a Novell product. "What we're trying to

accomplish with this new GUI installation utility," explains Simon Kandah, a product marketing manager at Novell, "is to leave users with an up-and-running BorderManager server with a default configuration by the end of the installation process." In previous versions of BorderManager, even after you installed the software, you had to perform a couple of extra steps before the BorderManager server was up and running.

SINGLE SIGN-ON

In addition to its interface lift, BorderManager 3.0 offers a few other management enhancements that will probably make your life—and users' lives—easier. For example, in previous versions of BorderManager, users who attempted to access a web site through the HTTP proxy had to log in to this proxy using a unique username and password, rather than their NDS username and password. The username and password users entered to authenticate to the HTTP proxy had to be different than their NDS username and password because the authentication information was sent over the wire in clear text. As a result, someone could potentially discover usernames and passwords and compromise security for the entire network.

With BorderManager 3.0, users at workstations running Novell's 32-bit client software do not need to log in to the HTTP proxy at all. These users log in just once to NDS, which provides the background check necessary to enable authentication to the HTTP proxy.

So what about users at workstations that are not running Novell's 32-bit client software, such as users at UNIX and Macintosh workstations? Admittedly, these users have to log in to the HTTP proxy. But the good news is, users at such workstations can use their NDS username and password to authenticate to the HTTP proxy.

Get Your SOCKS On!

Users at workstations that are not running Novell's 32-bit client software can use their NDS username and password to authenticate to the HTTP proxy for two reasons: BorderManager 3.0 supports SOCKS versions 4 and 5, and BorderManager 3.0 supports a number of authentication methods, including real NDS authentication and authentication using the Secure Sockets Layer (SSL) protocol.

(With real NDS authentication, passwords never cross the wire.)

SOCKS is a security mechanism that enables a server inside a firewall to access resources outside that firewall while maintaining the internal server's security requirements. SSL, a protocol designed by Netscape Communications, provides for encrypted, authenticated communications across intranets and

the Internet and between servers and web browsers.

If you want to enable users at workstations that are not running Novell's 32-bit client software to authenticate to the HTTP proxy using their NDS username and password, you must configure the BorderManager server as a SOCKS server to which SOCKS clients can then connect. Naturally, these workstations must be



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running SOCKS client software. SOCKS client software is available for UNIX and Macintosh, but this client software is not included with BorderManager 3.0.

To configure a BorderManager server as a SOCKS server, you choose the Gateway tab from the BorderManager Setup detail and, from the Gateway window, double-click the SOCKS V4 and V5 button. The next window that appears allows you to configure the BorderManager server as a SOCKS server. For example, you can specify the authentication method you want users to use when accessing the BorderManager server. You can select the following authentication options:

- No authentication required, and data in clear text
- No authentication required, but data encrypted using SSL
- Authentication required (using NDS username and password), and data in clear text
- Authentication required (using NDS username and password), and data encrypted using SSL

- Real NDS authentication, and data in clear text
- Real NDS authentication, and data encrypted using SSL

You can also configure a BorderManager server as a SOCKS client. You can then use BorderManager 3.0 inside a space protected by a SOCKS-compliant firewall, thereby preserving your company's investment in its existing firewall.

To configure a BorderManager server as a SOCKS client, you would click the SOCKS Client button shown on both the Acceleration tab and the Application Proxies tab in the BorderManager Setup detail. The SOCKS Client window allows you to specify the address of the SOCKS server to which you want the BorderManager server to authenticate.

For example, suppose that you were using BorderManager 3.0 to protect an internal border between your company's network and the web server for the human resources department. Also suppose that you had already installed a third-party, SOCKS-compliant firewall on the

border between your company's network and the Internet. If you wanted users in the human resources department to use BorderManager 3.0 services to access the Internet (including an application proxy or the Novell IP gateway), these users could do so only if the BorderManager server could authenticate to the firewall.

To ensure that the BorderManager server could authenticate to the firewall, you would configure the BorderManager server on the internal border as a SOCKS client. You would then specify the firewall's IP address as the SOCKS server to which you wanted the BorderManager server (configured as a SOCKS client) to authenticate. Thereafter, Internet requests from users in the human resources department would pass through the BorderManager server, which would forward these requests to the firewall.

THERE'S MORE WHERE THAT CAME FROM

Although this article discusses several of the new features available in BorderManager 3.0, it does not discuss all of them. There are more where these features came from, but you'll have to check out BorderManager 3.0 for yourself to discover every one. For example, the site-to-site virtual private network (VPN) included with BorderManager 3.0 now supports the IP Security (IPSec) protocol and the Simple Key Management for Internet Protocol (SKIP). (For more information about VPNs and about IPSec and SKIP, see "Virtual Private Networks: Making a Public Network Private," *NetWare Connection*, February 1998, pp. 6-21. You can download this article from <http://www.nwconnection.com/feb.98/vpn28.>)

Novell chose to support these emerging industry standards to increase the potential for interoperability between the BorderManager VPN and other VPNs that also support IPSec and SKIP. Of course, at this stage, no VPN vendor can guarantee interoperability. A. E. Natarajan, engineering manager for Novell's BorderManager group, points out that while support for IPSec and SKIP ensures interoperability on the wire, it cannot guarantee interoperability between VPN configurations. The Internet Engineering Task Force (IETF), Natarajan says, is still working to resolve problems related to interoperability between VPN configurations.

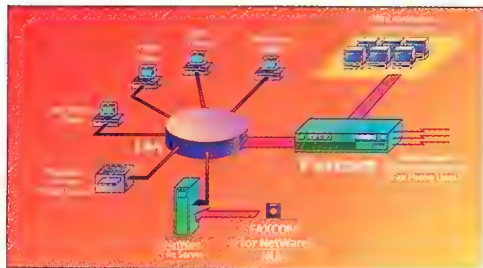
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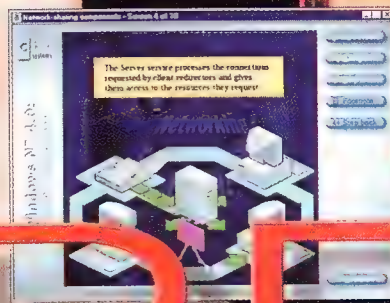
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Take Your Work Home—Or Wherever

BorderManager 3.0 includes Virtual Private Network (VPN) services, which allow you to establish site-to-site tunnels between servers. To extend these VPN services, you can now purchase a Client VPN. This client-server software enables dial-up users to establish secure VPN tunnels from Windows 95 or Windows 98 clients to BorderManager 3.0 servers.

Using this secure client-to-site VPN tunnel, remote users can access other servers on the network to which the BorderManager 3.0 server is connected. In fact, users can access all of the network resources to which they have rights. In other words, once users have established a tunnel, they will feel right at home, or rather, right at work—just as if they were using their own workstation at the corporate office.

DOUBLE-CLICK YOUR WAY TO THE OFFICE

Novell designed the Client VPN software with ease-of-installation in mind. Novell ships the Client VPN software on CD-ROM. Users simply run the SETUPDOC.EXE file from the CD-ROM, and this file installs the Client VPN software. During this installation process, the SETUPDOC.EXE file also creates a Client VPN icon on the users' desktop.

To establish a secure tunnel with a BorderManager 3.0 server, users double-click the Client VPN icon. The first time users use the Client VPN software, they are prompted to enter a dial-up username and password for their Internet Service Provider (ISP) account. After entering this username and password, users are prompted to enter their Novell Directory Services (NDS) username and password.

This NDS authentication is identical to the NDS authentication that occurs on a local network, with one exception: The exchange of authentication information between a BorderManager 3.0 server and the Client VPN software occurs over Transmission Core Protocol (TCP) rather than over NetWare Core Protocol (NCP).

After this initial login, the Client VPN software provides a single sign-on. That is, after users have entered their dial-up username and password once—and only once—the BorderManager 3.0 server stores this information in NDS. The next time users attempt to login to the network by way of the Client VPN software, they need to enter only their NDS username and password. Users can then attach to the Internet (by way of their ISP) and authenticate to the remote NetWare network.

Novell also offers several value-added services for BorderManager 3.0, including BorderManager Authentication Services and the new client VPN services. (For more information about client VPN services, see "Take Your Work Home—Or Wherever.")

The number of features in BorderManager—even before BorderManager 3.0—prompted *Network Magazine* to name it the Product of the Year for 1998 in the Proxy Server category. (See "1998 Products of the Year," *Network Magazine*, Apr. 1998. You can also

download this article from <http://www.networkmagazine.com/magazine/archive/1998/04/9804poy.htm>. To access this issue, however, you must complete an online membership form.)

Interestingly, *Network Magazine* admits that the label *proxy server* is essentially "obsolete. Novell has taken this product niche," the article explains, "and gone many levels above what anyone else is doing." The article goes on to say that BorderManager FastCache is only the beginning of Novell's offering and then devotes a paragraph to listing a few, but

ENCRYPTION IS THE KEY

Once a user has been securely authenticated to NDS, the Client VPN software retrieves its private Rivest-Shamir-Adleman Algorithm (RSA) key. Ultimately, both the BorderManager 3.0 server and the Client VPN software have their private and public RSA key pair, which enables the client and the server to securely exchange Diffie-Hellman values. (Diffie-Hellman is a cryptographic algorithm.)

The Client VPN software uses the Diffie-Hellman values to generate Diffie-Hellman public and private keys, which the Client VPN software and the BorderManager 3.0 server then use to securely exchange RC2 keys. The Client VPN supports both 40-bit and 128-bit RC2 keys, which the client and server use to encrypt and decrypt data.

This process of establishing a secure session between the Client VPN software and a BorderManager 3.0 server occurs in just seconds. In fact, in a keynote address at BrainShare '98 in Salt Lake City, Drew Major, Novell's chief scientist and vice president of advanced development, demonstrated the Client VPN software on stage. Drew logged in to the Novell corporate network and established a secure session within seconds. (You can view Major's keynote address at <http://www.novell.com/webcast/98/bs98/index.htm/#major>. The Client VPN software demonstration begins about 24 minutes into Major's address.)

A CLIENT VPN UNLIKE ANY OTHER

The Client VPN software for BorderManager 3.0 offers two features not available with other Client VPN solutions:

- NDS integration
- Selective encryption

NDS Integration. Because the Client VPN software is fully integrated with NDS, you can control which User objects can use this software to log in to the BorderManager 3.0 server. Using the BorderManager 3.0 snap-in for the NetWare Administrator (NWADMIN) utility, you open the BorderManager Access Control detail to grant access control rights for the Client VPN software. You can grant an Organization object, an Organizational Unit object, a Group object, or a User object rights to access the network by way of the Client VPN software.

—continued on page 21

certainly not all, of BorderManager's other features—for example, NAT, firewall security features, and VPN capabilities. The new features available in BorderManager 3.0 further extend this list. In fact, next year, *Network Magazine* will probably need more than a paragraph to list all of the features available in BorderManager 3.0.

Linda Boyer is a frequent contributor to *NetWare Connection*. She works for Niche Associates, an agency that specializes in writing and editing technical documents. Niche Associates is located in Sandy, Utah. ●

—continued from page 20

For example, suppose you set up a BorderManager 3.0 server for the marketing department and you wanted only users in this department to access the network by way of the Client VPN software. In this case, you could create a Group object for the marketing users and grant Client VPN rights only to that Group object.

Selective Encryption. Selective encryption enables you to specify the BorderManager 3.0 servers with which you want the Client VPN software to exchange encrypted data. With selective encryption, the Client VPN software doesn't have to encrypt data when exchanging data with other Internet servers. The Client VPN software encrypts data only when exchanging data with the BorderManager 3.0 servers you specify.

In contrast, when you use other Client VPN solutions, such as solutions that rely on the Point-to-Point Tunneling Protocol (PPTP), all data is encrypted, regardless of the server with which the client is exchanging data. As you might suspect, encrypting all data is far less efficient than encrypting only data that needs to be encrypted.

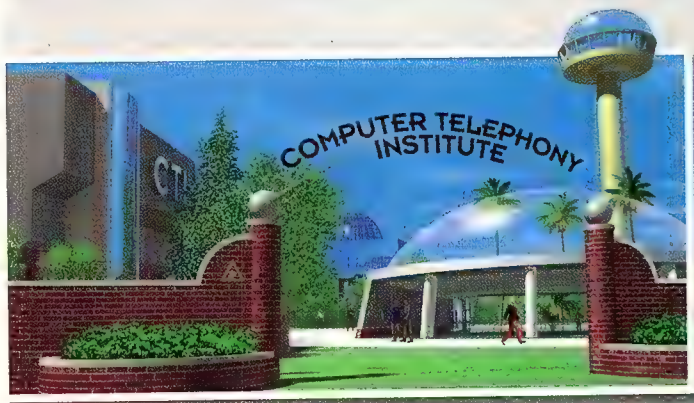
As with the NDS access control rights (and, in fact, all configuration options), selective encryption is configured at the BorderManager 3.0 server. To configure selective encryption, you use the BorderManager 3.0 snap-in module for the NWADMIN utility to create what is called a *protected network list*. In the protected network list, you type only the IP addresses of the servers

with which you want the Client VPN software to exchange encrypted data. The Client VPN software will not encrypt data when exchanging information with servers that are not on the protected network list.

For example, suppose a client were using the Client VPN software to connect to a BorderManager 3.0 server at Novell. Although the client was accessing the Novell network through the Client VPN software, the client would actually connect to the Internet through an ISP. Thus, the client would not necessarily communicate only with Novell servers. The client might also access the Internet and browse World-Wide Web sites.

If the client accessed <http://www.cnn.com>, the information exchanged between the CNN server and the client would obviously not need to be encrypted. Only when the client was accessing Novell servers by way of a BorderManager 3.0 server would the data exchanged between the client and the server need to be encrypted. To ensure that data is encrypted only when exchanged between BorderManager 3.0 servers and a client accessing those servers via the Client VPN software, you would create a protected network list that contained the IP addresses for the BorderManager 3.0 servers.

The Client VPN software, like the BorderManager 3.0 site-to-site VPN, supports both IP and IPX traffic. One BorderManager 3.0 server can support up to 1,000 Client VPN connections using IP and up to 250 Client VPN connections using IPX. ●



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NDS and Z.E.N.works

Creating Transparent, Easily Managed Networks

Editor's Note: Does your company need Novell Directory Services (NDS)? Or is your company using NDS to its full potential? Over the next year, the Novell Certified Professional section will be focusing on NDS, explaining how you can use NDS today to better manage your company's network. The Novell Certified Professional section will feature NDS-enabled products (such as Novell's Z.E.N.works), how-to articles, and tips and tricks.

Do you dream of a network that is so easy to use it is invisible to the user and practically manages itself? In May, Novell began shipping Zero Effort Networks (Z.E.N.works), bringing these dreams closer to reality. Z.E.N.works is a desktop management tool that works with Novell Directory Services (NDS) to make the network transparent to users and easier to manage.

NDS PROVIDES THE FRAMEWORK

Although a completely transparent, self-managing network may seem impossible, Novell has made strides toward this goal with NDS. NDS provides a framework that integrates all network components, including users, computers, printers, modems, fax devices, applications, and operating systems. Because NDS integrates these components, you can access and manage all network devices from any workstation on the network. And no matter which workstation a user uses to access the network, NDS provides a consistent view of all available resources.

Z.E.N.works simplifies access and management of network resources even more by extending NDS to include information that is normally stored on Windows NT, Windows 95, or Windows 3.x workstations. For example, Z.E.N.works uses NDS to store information such as applications, printers, and the appearance of the desktop. With NDS and Z.E.N.works, users see a familiar environment, whether they log in from their own workstation, a workstation down the hall, or a workstation halfway around the world.

Z.E.N.works and NDS save you time because they eliminate the need to manually configure each workstation on the network. If you need to troubleshoot a workstation, NDS and Z.E.N.works allow you to view user and workstation information and to remotely control the workstation—all without leaving your desk.

ZERO EFFORT NETWORKS

If you are like most network administrators, you spend countless hours walking to workstations to install new applications, to



troubleshoot problems, and to perform routine maintenance. Manually performing these tasks not only increases management costs but has a significant impact on users' productivity. Users sometimes have to wait days or even weeks to get applications installed or their workstation problems fixed.

Z.E.N.works solves these problems by providing you with tools that reduce the amount of workstation support required on a network. Users can then concentrate on their productivity, without becoming computer experts.

Z.E.N.works includes the following components: application management and distribution, desktop management, and desktop maintenance.

Application Management and Distribution

Z.E.N.works includes the Application Launcher, the application management and distribution software formerly called the Novell Application Launcher (NAL). The Application Launcher works with NDS, allowing you to centrally manage, upgrade, and even distribute applications across your company's network.

Using the Application Launcher, you can dynamically update users' desktops when new applications become available, you can modify registry or INI settings, and you can even provide application load balancing and fault tolerance. You can also use the Application Launcher to handle installation-related questions or problems that may occur months later. You can perform all of these tasks, without leaving your workstation.

Fool-Proof Access to Applications

The Application Launcher insulates users from the complexities of the network. When you install the Application Launcher on users' workstations, the Application Launcher icon appears on the desktops. If users double-click this icon, the Application Launcher

window appears, displaying the icons for the applications with which a user is associated. (To give users the necessary rights to run applications, you associate users with these applications.) The definitions for these applications are stored in NDS.

When a user launches an application, the Application Launcher performs all of the tasks necessary to run the application: For example, the Application Launcher connects to required resources (such as network drives and printers), "pushes" down any components needed on the workstation, and updates registry settings. Because the applications are delivered through NDS and are associated with particular User objects, a user sees the same set of applications, regardless of the workstation from which the user logs in to the network.

Application Objects

Using the NetWare Administrator (NWADMIN) utility, you can create Application objects to define applications in the NDS tree. Each Application object contains the information needed to run an application (such as the directory path to the executable file and registry settings).

The Application object also specifies which users can run the application. You can associate Application objects with User objects, Group objects, or container objects. Applications defined in NDS are dynamically delivered to users' desktops, and any changes made to an existing Application object are automatically refreshed on the users' desktop.

You can create Application objects for many purposes—all of which eliminate the need to visit each workstation to install applications. For example, you can create Application objects to do the following:

- Provide access to network-based applications (dynamically delivering icons to the desktop)
- Install or upgrade workstation-based applications
- Install or upgrade Novell client software
- Upgrade desktop operating systems

If you are creating an Application object to install a complex application, you can use the snAppShot utility to simplify the installation process. The snAppShot utility keeps track of the files that the setup program installs on the workstation, copies these files, and stores them for use when installing the application. The snAppShot utility also uses special files to record infor-

mation about the changes an application's setup program makes to the workstation's configuration. The snAppShot utility stores this information as either an Application Object Template (.AOT) or an Application Object Text Template (.AXT).

An .AOT file is written in binary format and cannot be modified. An .AXT file is written in text format and can be viewed or modified with a text editor. The .AXT file takes longer to import into an

Application object and is prone to inaccuracies if you do not follow certain .AXT file format standards.

After the snAppShot utility records this information, you can use the .AOT or .AXT file to create and configure an Application object. Then when a user launches the application from his or her workstation, Z.E.N.works installs the application with the configuration that is recorded in the .AOT or .AXT file.

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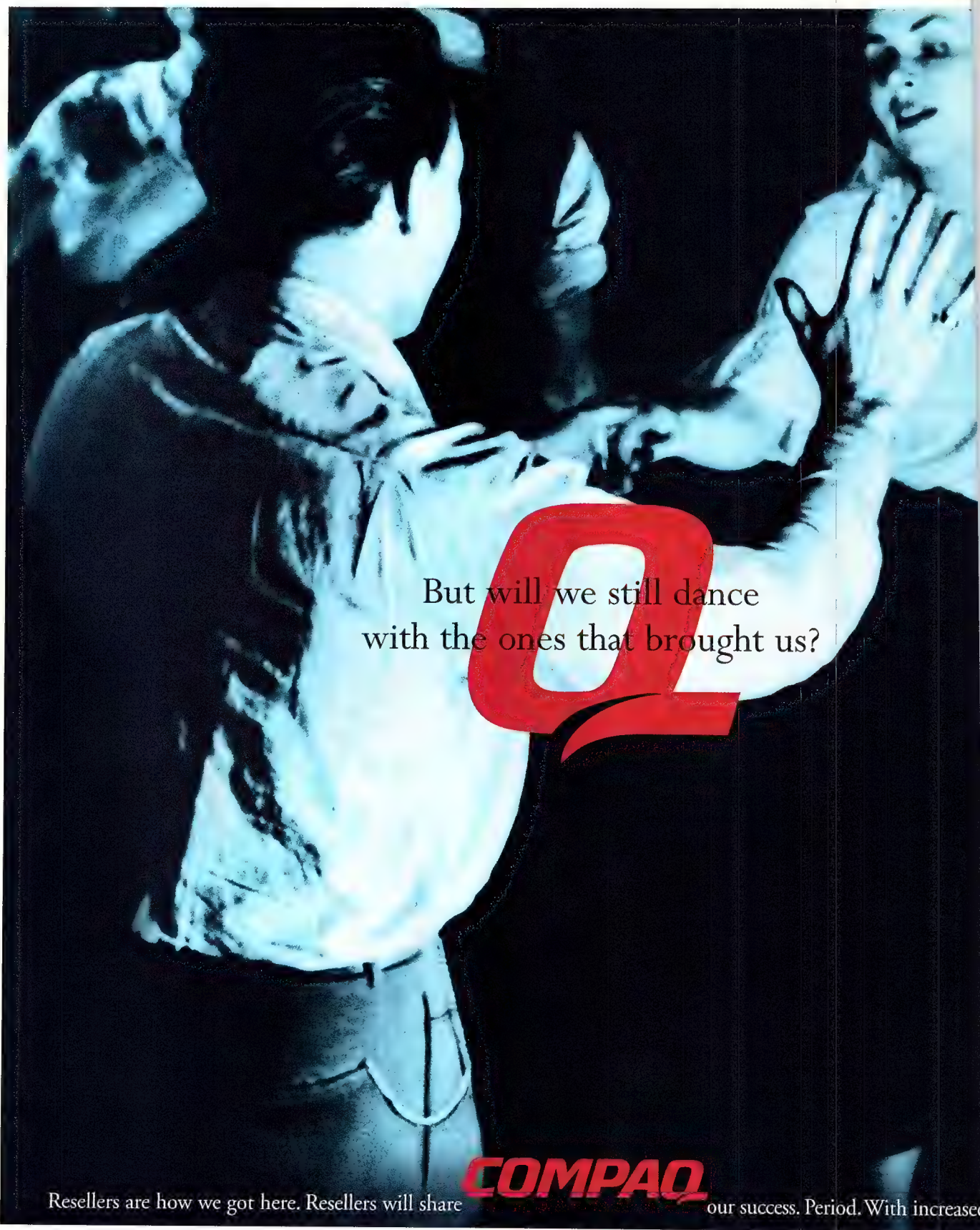
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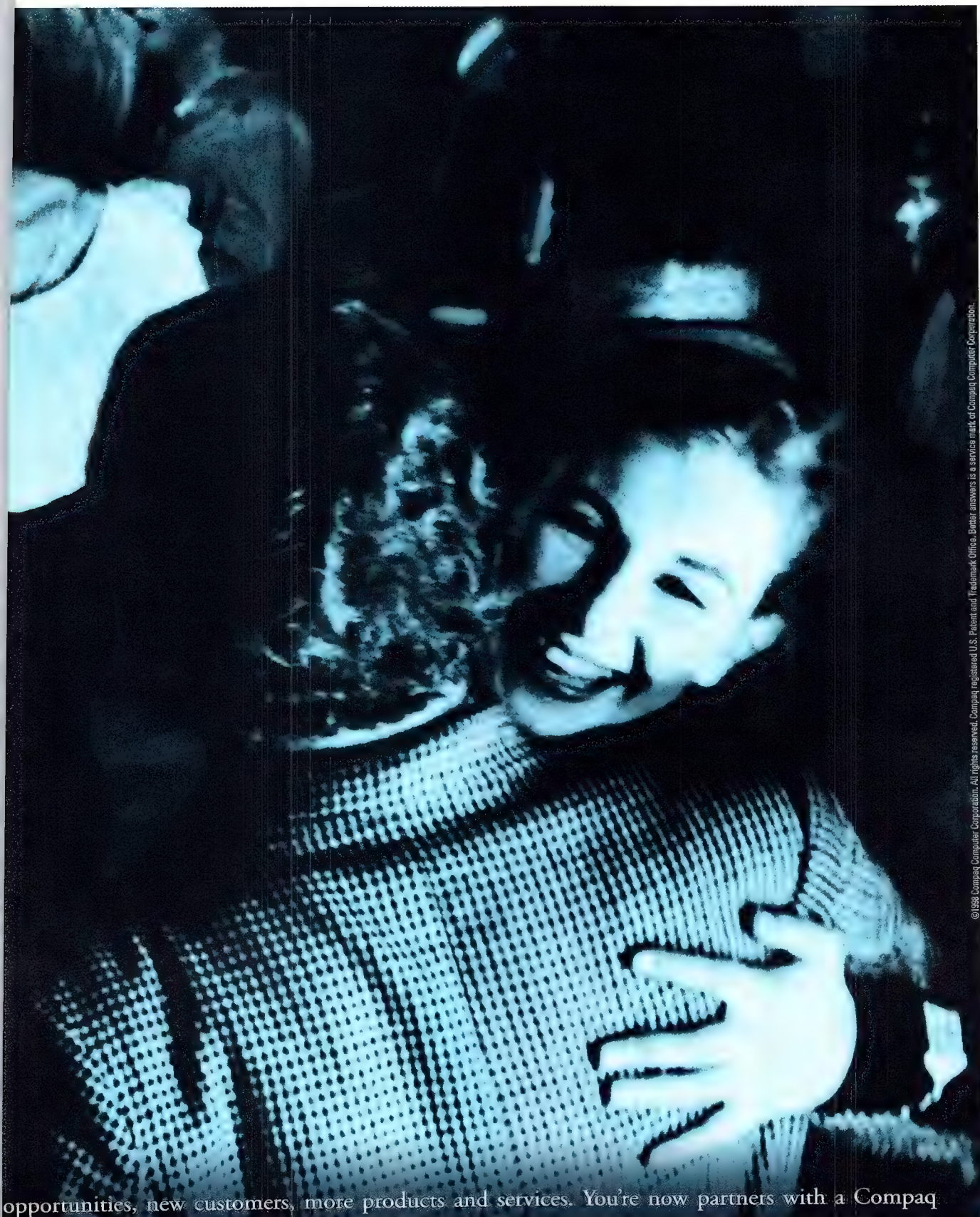
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Novell Client Configuration

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NT Desktop Preferences

NT User Printer

NT User System Policies

Remote Control Policy

Workstation Import Policy

Novell Client Configuration

NT Computer Printer

NT Computer System

Remote Control Policy

Restrict Login

Workstation Inventory ●

Intelligent Application Launching

Because some companies have so many users who need to access the same applications, these companies have multiple servers to handle the workload. Without Z.E.N.works, providing application load-balancing across these servers requires two steps: You must first organize the users into separate groups. You must then create separate scripts for each group or place an icon on each workstation to point to the correct application server.

This solution is time consuming and labor intensive. Wouldn't it be nice if you could create an icon that pointed to all of the application servers and automatically selected which server would run the application? The Application Launcher provides this automatic load-balancing.

To set up automatic load-balancing for an application, you launch the NWADMIN utility and access the Application Details page for the appropriate Application object. You then open the Fault Tolerance

page, enable the load-balancing check box, and add the directory path to the application servers you want to load balance. The Application Launcher will automatically handle load-balancing for this application.

The Application Launcher also provides fault tolerance for applications. For example, if your company had multiple servers, you could select an application to which you wanted to provide fault tolerant access and then install this application with the same configuration on any or all servers. You would then launch the NWADMIN utility and access the Application Details page for the appropriate Application object. You would open the Fault Tolerance page, enable the Fault Tolerance check box, and add the directory path to the servers on which you installed the application.

The Application Launcher would then automatically handle the fault tolerance for this application. When users selected the application, the Application Launcher

would contact the primary server. If this server were not available, the Application Launcher would contact the next server in the list and continue this process until a server responded.

You can also configure the Application Launcher to determine the nearest application. For example, suppose a user in the Atlanta office accessed Corel WordPerfect through the Application Launcher. If this user traveled to the San Francisco office, he or she could click the WordPerfect application icon in the Application Launcher window. NDS would then transparently direct the workstation to access the application on the San Francisco server instead of accessing the application across the WAN link on the Atlanta server. In this way, the Application Launcher reduces WAN traffic and costs.

Handling the Windows Registry

The Application Launcher fully supports the Windows registry. If you manually create an Application object, you can define any registry changes you want to include with the application. And as mentioned earlier, if you use an .AOT or .AXT file to create an Application object, the snAppShot utility automatically records any registry changes made when the application is installed.

Supporting Roaming Users

The Application Launcher supports Windows profiles, which enable users to roam. But is supporting these profiles enough? No—because parts of the registry, such as HKEY_LOCAL_MACHINE, are not included in the profile.

To understand why supporting HKEY_LOCAL_MACHINE is important, suppose a user accessed a network application through the Application Launcher. Also suppose this application required several components to be loaded on the workstation. The first time the user selected the application, the Application Launcher would install the necessary components on the workstation and launch the application. The next time the user accessed the application from this workstation, the application would immediately launch—it would not need to be reinstalled.

However, suppose the user logged in to the network from a different workstation. The user would see his or her familiar desktop and the information stored in the Windows profile. If the user launched the same application from the Application Launcher,

NOVELL CERTIFIED PROFESSIONAL

NDS and Z.E.N.works

it would install the needed components on the new workstation before launching the application.

When downloading applications to workstations, the Application Launcher stores application information in special keys in the HKEY_LOCAL_MACHINE part of the registry. Because this part of the registry does not move with the profile from workstation to workstation, the Application Launcher always knows when to download components to the workstation. The Application Launcher simply checks the keys in the HKEY_LOCAL_MACHINE part of the registry to determine if the components have been downloaded to the workstation.

No Traffic Jams, Please

Because the Application Launcher provides so many time-saving features, it is easy to forget that installing a new application on hundreds of workstations at the same time causes congestion on networks and servers. Fortunately, the Application Launcher allows you to spread out the load over a period of time. For example, you

could specify that the Application Launcher install an application over a week.

You can also configure Z.E.N.works to automatically upgrade an application on all workstations over a period of time—without user intervention. When you configured the Application object, you would check the “Run Once” box and make the icon show up in the startup folder.

DESKTOP MANAGEMENT

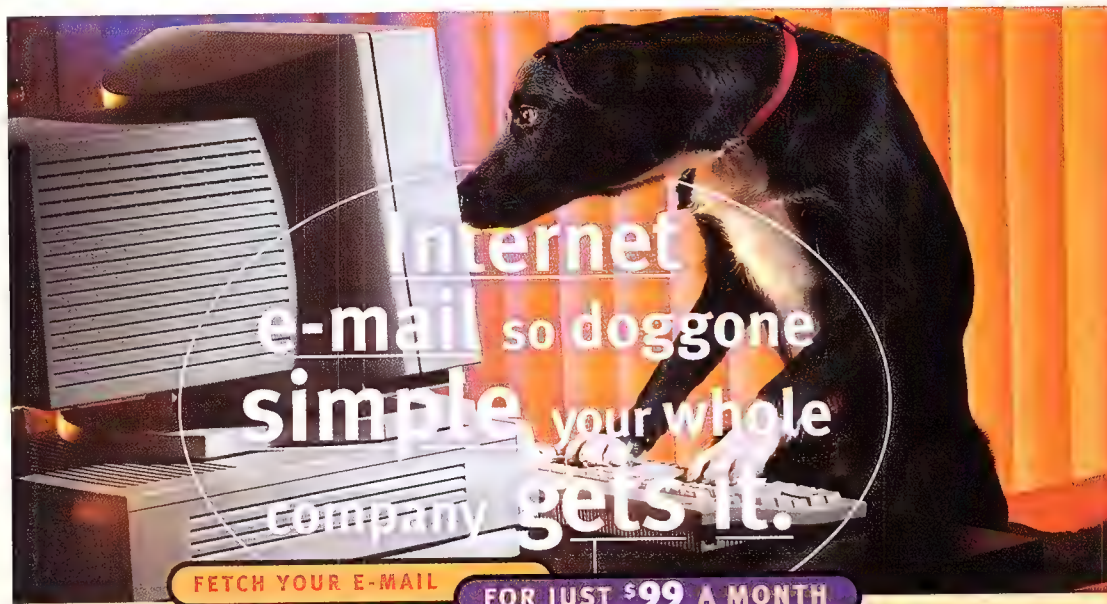
Z.E.N.works also includes the tools you need to manage users’ desktops—again, without leaving your workstation. To provide this central management, Z.E.N.works uses NDS to store the dependencies that are normally stored on the workstation. These dependencies include the following:

- **Desktop Preferences.** Desktop preferences are Windows NT and Windows 95 Control Panel options that control the appearance of the desktop. These options include Accessibility, Display, Keyboard, Mouse, and Sound.
- **Printer Configurations.** Z.E.N.works allows you to associate printers and print

drivers with workstations. With Windows NT, you can also associate printers and print drivers with NDS users. You can add or remove printers, select a default printer, and assign a print driver to each printer. You can also specify the settings for printers such as the number of copies to print.

- **Novell Client Parameters.** Z.E.N.works allows you to configure Novell Client parameters and to download these parameters to multiple workstations. For Windows 95, you can configure parameters such as Preferred Server, Preferred Tree, Protocols, and Services. For Windows NT, you can configure parameters such as Preferred Server, Preferred Tree, Workstation Manager, and NetWare/IP.
- **Remote Access Server (RAS) Configurations.** Z.E.N.works allows you to configure phone book entries for dial-up networking. Through NDS, you can select a dial-up number, or create, edit, or delete a dial-up entry.

Because these dependencies are stored in NDS, you can make the changes once in



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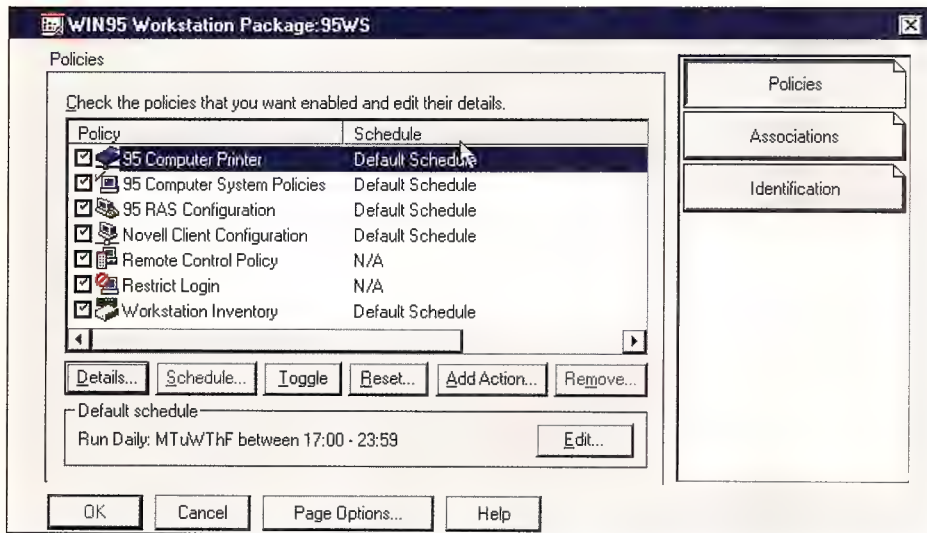


Figure 1. To enable policies, you create a Policy Package Object in the NWADMIN utility.

the NWADMIN utility and then allow NDS to deploy the configuration to the workstations you have specified. When a user logs in to the network, NDS and Z.E.N.works automatically configure the user's workstation based on the parameters you have selected.

Policy Packages

Z.E.N.works stores workstation dependencies as individual policies in NDS. To simplify the management of these policies, Novell has grouped these policies into Policy Package objects, which you can associate with User, Group, or container objects.

Z.E.N.works includes three types of Policy Package objects: container, user, and workstation. Because Z.E.N.works supports Windows NT, Windows 95, and Windows 3.1x, you can create Policy Package objects for a particular operating system. As a result, you can create seven Policy Package objects:

- Container Package object
- Windows 3.1x User Package object
- Windows 3.1x Workstation Package object
- Windows 95 User Package object
- Windows 95 Workstation Package object
- Windows NT User Package object
- Windows NT Workstation Package object

Each Policy Package object contains multiple policies that are customized for a specific operating system. (See "Policy Package Objects" on p. 28.)

Z.E.N.works policies are disabled by default. To enable these policies, you must use the NWADMIN utility to create a Policy Package object. You can then enable a specific policy by clicking the policy's check box. (See Figure 1.) In order for the enabled policies to take effect, you must associate the Policy Package object with a User, Group, or container object.

Effective Policies

Just as NDS has effective rights, Z.E.N.works has effective policies. Effective policies are the sum of all enabled policies in all Policy Package objects that are associated either directly or indirectly with a particular object.

Z.E.N.works leverages the hierarchical structure of NDS, allowing policies to flow down the NDS tree. For example, suppose you enabled the Restrict Login policy in a Workstation Policy Package object and you associated this object with a container object. All of the users in the container object would inherit the Restrict Login policy.

By default, NDS searches up the tree for effective policies. The default search order is leaf object, Group object, and then container objects—until NDS reaches the [Root] of the tree.

You can use the Container Search Policy to modify this search order. By enabling this policy and associating it with a container object, you can change the search order or limit the search to one, two, or all three locations.

For example, you could set the search order to begin with leaf objects and then to search only the parent container object. You could exclude Group objects and any

container objects above the parent container object from the search. By limiting the search levels in NDS, you can eliminate unnecessary network traffic.

Windows 95/NT Policy Support

Z.E.N.works supports the user and computer system policies that are included with Windows 95 and Windows NT. (See "Policy Package Objects" on p. 28.) Using these system policies, you can set attributes for the workstation to control the way the desktop looks. These attributes remain the same, regardless of which user logs in from the workstation.

Z.E.N.works has improved these system policies by storing them in NDS and enabling you to create and manage them through the NWADMIN utility instead of Microsoft's POLEDIT utility. NDS and Z.E.N.works provide two benefits:

First, you have a central point of administration for system policies. You create a system policy only once using the NWADMIN utility, and you don't have to copy the system policy to the SYS:PUBLIC directory of each server. When you need to change a system policy, you only have to make the change once.

Second, NDS and Z.E.N.works provide fault tolerance for system policies because NDS is distributed and replicated.

Workstation Inventory Policy

Z.E.N.works also includes a Workstation Inventory policy. You can use this policy to gather workstation inventory information and store this information in NDS Workstation objects.

Z.E.N.works stores the following workstation inventory information in NDS:

- Hard disk space
- RAM
- Operating system version
- Interrupts, I/O ports, and DMA channels in use
- Services and devices running on the workstation

When a change is made to the workstation, Z.E.N.works senses this change and automatically updates the workstation information in NDS. As a result, you always have the most current information about a workstation at your fingertips.

Roaming Profiles for Windows NT

Z.E.N.works also enables you to store roaming profiles for Windows NT work-

stations in NDS. As a result, a user has the same profile, regardless of the workstation from which the user logs in to the network. The user's desktop always looks the same, and the user has access to the same applications.

You enable roaming profiles through the NT Desktop Preferences in the NT User Policy Package. By selecting the Roaming Profiles tab, you can enable roaming profiles and define where on the network the profiles should be stored.

DESKTOP MAINTENANCE

Although Z.E.N.works significantly reduces the amount of time you spend visiting workstations, users will still experience problems that require diagnosis and troubleshooting. Unfortunately, there is typically no clear way for a user to notify the IS help desk of a problem. At some companies, users may not know who to call, or they may have to leave a message or wait on-hold until a support technician is available. As a result, companies spend millions of dollars each year on desktop management and loss of user productivity.

To provide a solution for these challenges, Z.E.N.works includes the following desktop maintenance technologies:

- A help desk component that is tightly integrated with NDS, allowing users to communicate problems efficiently to the IS help desk
- Remote control software for Windows NT and Windows 95 workstations that requires NDS security privileges
- Snap-in modules for the NWADMIN utility, allowing you to customize how users participate in diagnosing a workstation problem and which support technicians can remotely control workstations

Help Desk Policies

To help users communicate problems to the IS help desk, you can use the NWADMIN utility to create a help desk policy, which contains the contact information users need when a problem occurs. For example, this policy contains names, e-mail addresses, and telephone numbers.

When a problem occurs, users can use the Z.E.N.works Help Request application (which you can quickly and easily distribute through the Application Launcher) to find the contact information and report the problem through an e-mail message or a telephone call.

The Help Request application then uses information about the user's workstation (which is gathered by the Workstation Inventory policy and stored in NDS) to facilitate the resolution of the problem. A user doesn't need to know detailed information about his or her workstation since this information is stored in NDS.

Remote Control Policies

After a problem is identified, a support technician can use the Z.E.N.works remote control software to connect to the workstation and repair it. The support technician must have the appropriate NDS access rights to remotely control the workstation. To grant these access rights, you create remote control policies that govern who can establish a remote control session and on which workstations.

When you create a Remote Control Policy, you can configure the following:

- Enable remote control
- Prompt the user to grant permission to have his or her workstation controlled remotely

- Give the user an audible signal when his or her workstation is being controlled remotely
- Give the user a visible signal when his or her workstation is being controlled remotely
- Define the default protocol for the remote control agent

Because the Remote Control policy is contained in both Workstation Policy Package objects and User Policy Package objects, you can manage remote control on either the workstation or the user level.

CONCLUSION

Z.E.N.works makes the dream of a transparent, nearly self-managing network a reality. Z.E.N.works solves most of the application, workstation management, and workstation maintenance challenges you face today, thereby lowering the cost of managing complex networks. (For information about the next version of Z.E.N.works, see "Novell News" on p. 42.)

Sandy Stevens is a freelance writer based in Salt Lake City. ●

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Psychological Viruses

Mark Lofgren

Computer viruses scare us all. After all, these viruses can destroy computers and months or even years of work. As a network administrator, you know the time and money it takes to protect your company's computers and data.

And if the actual viruses themselves aren't enough to worry about, people have begun preying on our paranoia by starting virus hoaxes. For example, the Good Times virus hoax had many people fearing that their data would be destroyed. The creators of this hoax sent an e-mail message worldwide, warning people that a separate e-mail message with the subject line "Good Times" contained a virus. If you received this message, the Good Times virus would supposedly destroy your computer's hard drive and send the processor into an infinite binary loop, which would damage the processor itself. Could an e-mail message really create this damage?

KNOWLEDGE IS POWER

Understanding how viruses work can protect you against virus hoaxes. Two kinds of viruses can infect a computer: file viruses and boot sector viruses.

File viruses are more common than boot sector viruses. As the name suggests, file viruses are usually macros that infect files created by applications such as Microsoft Word or Microsoft Excel. For example, the Concept virus changes codes in the NORMAL.DOT file that Word uses to generate macros. If you open a Word file that is infected by this virus, your computer becomes infected.

Although infected with the Concept virus, your computer will continue to function normally, and no data will be lost. When you open a Word file, however, you will experience problems. For example, some macros may not function, and you may not be able to save files.

File viruses are usually easy to eliminate because most virus-protection software can easily detect these viruses and eliminate them. Several companies such as Network Associates Inc. and Computer Associates offer virus-protection software for servers and workstations.

Unfortunately, boot sector viruses are more dangerous because they can damage executable files on your computer's hard drive. However, the only way a computer can get a boot sector virus is to boot from a diskette that is infected with the virus. If you boot a computer with an infected diskette in the floppy drive, the virus copies itself into the computer's memory. The virus later writes itself to the master boot record on the hard drive.

Boot sector viruses, such as the Antiexe virus, corrupt executable files on the hard drive. As a result, you will be unable to run these executable files.

Eliminating boot sector viruses is also relatively simple if you have virus-protection software. However, the longer the virus is allowed to run, the more damage it will do. To detect

the boot sector viruses as quickly as possible, you should run virus-protection software regularly.

YOU DON'T FOOL ME

To answer the question posed earlier, an e-mail message that is just text cannot destroy a computer's hard drive or processor. Viruses are spread from files or boot sectors, and an e-mail message that contains only text has no file or boot sector.

Of course, an e-mail message may have an attachment that contains a virus. If you don't open the attachment, the virus cannot infect your computer. Since most people open attachments, however, the key is detecting the virus before it has a chance to spread.

Depending on the virus-protection software you are using, you can have the file scanned as soon as it is saved on your computer's hard drive. If the virus-protection software is up-to-date, it will detect the virus before the virus can damage your computer.

SOME HOAXES ARE HARMLESS

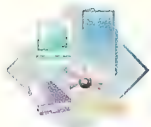
Because virus programmers sometimes disguise their viruses with computer games or screen savers, people have become suspicious of games and screen savers. As a result, people can unknowingly create a virus hoax. For example, Access Softtek released GHOST.EXE, an entertaining Halloween screen saver that featured ghosts flying around a graveyard. Although this screen saver was harmless, many people thought it might contain a virus, which would be triggered on a specific date. However, the original GHOST.EXE did not contain any virus code.

Many people also thought the Budweiser Frog screen saver contained a virus. In fact, an e-mail message was circulated, warning that the Budweiser Frog screen saver would crash your computer hard drive. However, I have used this screen saver for a long time, and my hard drive works just fine.

Don't take my word for it, however. If you think your computer may have a virus or if you have heard that a particular program or file contains a virus, check it out. Make sure the virus-protection software you are using is up-to-date, and scan the program or file. You can visit Network Associates' World-Wide Web site (<http://www.nai.com/vinfo>) for more information about virus threats. (Network Associates was formed by the merger of McAfee Associates and Network General.) You can also visit Computer Associates' web site (<http://www.cheyenne.com/virusinfo>) or Dr. Solomon's web site (<http://www.drsolomon.com/home/home.cfm>). (Dr. Solomon's also merged with Network Associates.)

To learn more about protecting your company's network from virus attacks, see the related article on page 38. For more information about e-mail hoaxes, visit <http://urbanlegends.miningco.com/library/blhoax.htm>.

Mark Lofgren provides technical support on the Internet for The Forums (<http://theforums.com>). ●



Backup Products That Support NetWare

In the August and September issues of *NetWare Connection*, Mickey Applebaum devoted his "Technically Speaking" column to a two-part discussion on performing backups. As Mickey explained, you must back up two components on an intraNetWare or NetWare server: Novell Directory Services (NDS) and the NetWare file system.

Because these components perform different functions, each component has unique backup requirements. You must ensure that your company's backup process meets these requirements. Only then can you successfully back up both components and restore them in the event of a server failure. To understand the backup requirements for NDS and the NetWare file system, read the following articles:

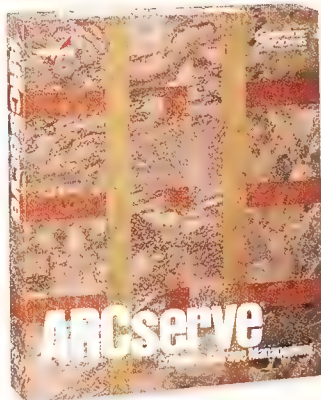
- "Technically Speaking: Backing Up NDS," *NetWare Connection*, Aug. 1998, pp. 43-45. You can download this article from <http://www.nwconnection.com/aug.98/techsp88>.
- "Technically Speaking: Backing Up the NetWare File System," *NetWare Connection*, Sept. 1998, pp. 38-42. You can download this article from <http://www.nwconnection.com/sep.98/techsp98>.

Once you know the requirements for backing up NDS and the NetWare file system, you can ensure that your backup solution securely backs up both. This month's "Product Focus" highlights some of the backup software available to help you back up your company's critical data. All of the software products featured have been Novell Yes, Tested and Approved and are year 2000 compliant. This month's "Product Focus" also briefly describes the types of backup hardware available today and lists some companies that offer backup hardware. (See "Backup Hardware" on p. 36.)

ARCserve 6.1 FOR NETWARE

ARCserve 6.1 for NetWare, from Computer Associates International Inc. (the Cheyenne division), allows you to back up intraNetWare, NetWare 4.1x, and NetWare 3.1x servers. (Computer Associates is releasing a new version of ARCserve to support NetWare 5.) ARCserve 6.1 for NetWare includes the following features:

- **Novell Directory Services (NDS) Support.** ARCserve 6.1 for NetWare backs up NDS, including virtually any extended NDS schema. ARCserve 6.1 for NetWare also includes snap-in modules for Novell's NetWare Administrator (NWADMN) utility, allowing you to manage ARCserve objects.
- **File Interleaving.** ARCserve 6.1 for



Computer Associates' ARCserve 6.1

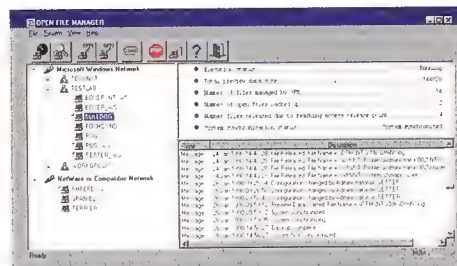
NetWare interleaves data at a file level, allowing you to concurrently back up multiple targets to a single backup tape. File interleaving allows ARCserve 6.1 for NetWare to back up your data more quickly and eliminates the need to purchase multiple tape drives.

- **Parallel Streaming.** ARCserve 6.1 for NetWare simultaneously backs up multiple sources to multiple target drives on a single server, doubling the throughput of the backup system. ARCserve 6.1 for NetWare also allows you to simultaneously back up data to one drive and restore data from another drive.
- **Server Prioritization.** When backing up multiple servers in a single job, you can rank the order in which the data is backed up.
- **Integrated Virus Scanning.** ARCserve 6.1 for NetWare uses virus-protection software to check files before writing them to a backup

tape. If the virus-protection software detects an infected file, ARCserve 6.1 for NetWare sends an alert and executes a user-defined instruction to skip, rename, or move the file. The backup process is not interrupted, and you can eliminate the virus later.

- **Error Wizard.** If an error occurs during the backup process, you can easily find out what the error message means by double-clicking the message. ARCserve 6.1 for NetWare then displays a detailed description of the error. You can also configure ARCserve 6.1 for NetWare to notify you directly if an error occurs.
- **Client Support.** ARCserve 6.1 for NetWare allows Windows 95, Windows 3.x, OS/2, and DOS users to back up data stored on their workstation or on the server. You can purchase client agents for Windows NT, UNIX, and Macintosh.

You can download a trial version of ARCserve 6.1 for NetWare from <http://www.cai.com/evaluate/download.htm>. For more information about ARCserve 6.1 for NetWare, visit the Computer Associates' World-Wide Web site (<http://www.cai.com/arcserve>). You can also call 1-800-225-5224. If you live outside the United States and Canada and you want to locate the Computer Associates office nearest you, visit <http://www.cai.com/camap.htm>, or call 1-516-342-5224.



St. Bernard's Open File Manager 5.1

OPEN FILE MANAGER 5.1

Designed as a complementary utility to backup software programs, Open File Manager 5.1 from St. Bernard Software captures open files during the backup process, even if these files are being modified. Without Open File Manager 5.1, backup software programs might skip open files, users might be locked out of applications,

BACKUP HARDWARE

How you configure your backup system depends on many variables—for example, how large your company's budget is, how quickly you need access to data in the event of a failure, how much data you are backing up, and whether you are also creating an accessible archive. There are as many backup options as there are ways to use them. The major types of backup systems are listed below:

JUKEBOX

By placing optical disks, CD-Recordables (CD-Rs), or CD-Rewriteables (CD-RWs) in a jukebox that can automatically load and unload disks, you can maintain a large amount of data in near-line storage. A jukebox is a permanent, high-capacity backup option with high reliability, but this option is more expensive than the many tape backup systems that are available. A jukebox is also a great backup option for archiving data and for keeping this data readily available for quick reference.

RAID

A Redundant Array of Independent Drives (RAID) system is a disk subsystem that combines multiple hard drives into one logical drive. A RAID system improves performance and data availability: If one hard drive in the RAID system fails, the other hard drives can still operate. A RAID system protects against hard drive failures but not against software failures or other hardware failures.

SERVER MIRRORING

Server mirroring is the most secure (and the most expensive) backup option. With server mirroring, every component associated with a server and its accompanying backup system is duplicated to another server. Server mirroring provides immediate online recovery of data, allowing you to simply switch to the secondary server if the primary server fails.

TAPE DRIVE

A tape drive is a physical backup device. A tape drive offers the lowest storage cost (starting at 2 cents per megabyte for a 4mm

backup tape) and provides an efficient storage format for data. However, a tape drive is one of the slower backup options, and data stored on a backup tape cannot be quickly accessed.

TAPE LIBRARY

In a tape library, a series of backup tapes are loaded into an autchanger, automating the process of accessing and rotating tape. Although a tape library can handle a large amount of data, this backup option performs more slowly than other options. A tape library is, however, a less expensive way to back up critical data that you do not need to access on a regular basis.

BACKUP HARDWARE VENDORS

You can visit the following companies' World-Wide Web sites to get information about specific backup hardware products:

- AIWA Raid Technology Inc. (<http://www.aiwa.com/csd/product/prodfram.htm>)
- Compaq Computer Corp. (<http://www.compaq.com>)
- Data General Corp. (<http://www.dg.com/storage>)
- Exabyte (<http://www.exabyte.com>)
- Fujitsu Computers (<http://www.fujitsu.com>)
- GigaTrend Inc. (<http://www.gigatrend.com>)
- Hewlett-Packard Co. (<http://www.hp.com/storage>)
- Hitachi Computer Products (America) Ltd. (<http://www.hitachi.com>)
- IBM Corp. (<http://www.storage.ibm.com>)
- Imation Corp. (<http://www.imation.com/dsp>)
- Iomega Corp. (<http://www.iomega.com>)
- Mitsumi Electronics Corp. (<http://www.mitsumi.com>)
- Samsung Information Systems America (<http://www.samsung.com>)
- Sanyo Electric Company Ltd. (<http://www.sanyo.com>)
- Seagate Technology Inc. (<http://www.seagate.com>)
- Sony Electronics Inc. (<http://www.ita.sel.sony.com/products/storage>)
- Toshiba America Information Systems Inc. (<http://www.toshiba.com>)
- Western Digital Corp. (<http://www.westerndigital.com>)

or worse, the backup data might become corrupted. Then in the event of a network failure, you could not restore these open files.

Open File Manager 5.1 supports all leading backup software (independent of the hardware you are using) and runs on the following operating systems:

- NetWare 4.x and 3.x servers
- Windows NT 4.0 and 3.51 servers and workstations

Open File Manager 5.1 monitors the file system for read requests coming from a backup software program. During the backup process, Open File Manager 5.1 makes a copy of open files and holds these

files in a cache, where the backup software program can then copy them.

Users have access to the open files throughout the backup process. If users change open files during the backup process, these changes are not saved to the backup tape. The backup software program saves open files as they appeared when the backup process began.

You can get more information or download a 15-day free trial version of Open File

Manager from St. Bernard's web site (<http://www.stbernard.com>). You can also call 1-800-782-3762 or 1-619-676-2277.



Seagate's Backup Exec 8.0

BACKUP EXEC FOR NETWARE 8.0

Backup Exec for NetWare 8.0 from Seagate Software Inc. supports IP, IPX, and Novell Storage Services (NSS), Novell's next-generation file system which is available in NetWare 5. In addition, Backup Exec for NetWare 8.0 supports Novell's Storage Management Services (SMS) and target service agents (TSAs).



Backup Exec for NetWare 8.0 offers the following new features:

- **Working Set Backup.** Backup Exec for NetWare 8.0 allows you to make a working set backup, which is a backup job that backs up all of the files users accessed during a period of time you specify. For example, if you did not want to make a complete backup every day, you could make a working set backup instead: You could specify that Backup Exec for NetWare 8.0 should back up all of the files users accessed during the last 24-hour period. You could then make a complete backup less often, such as twice a week.
- **Agent Accelerator.** Backup Exec for NetWare 8.0 includes Seagate's Agent Accelerator technology, which shortens backup times for remote servers.
- **Seagate Exec View.** Backup Exec for NetWare 8.0 includes Seagate Exec View, a multiplatform storage management console. Seagate Exec View allows you to centrally manage all backup jobs in a mixed Backup Exec for NetWare and Backup Exec for Windows NT environment.

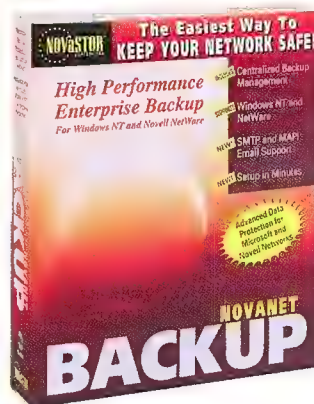
Backup Exec for NetWare 8.0 runs on a NetWare 5 or NetWare 4.1x server, from which you can also back up a NetWare 4.x server or NetWare 3.x server. (Backup Exec for NetWare 7.5 runs on NetWare 4.x and NetWare 3.11.)

You can download a 60-day trial version of Backup Exec for NetWare 8.0 from <http://www.seagate.com/benw/demod/content.asp>. For more information about Backup Exec for NetWare 8.0, visit Seagate Software's web site (<http://www.seagate.com>). You can also call 1-800-327-2232 or 1-407-531-7600.

NOVANET 7.0

NovaNet 7.0 from NovaStor Corp. offers advanced reports and diagnostics, the ability to schedule backup jobs months in advance, and a seamless integration with peripherals. NovaNet 7.0 also uses a standard user interface for all platforms, making it easy for you to work from any workstation. In addition, NovaNet 7.0 offers the following new features:

- **Multiple Concurrent Devices.** During a backup or restore job, NovaNet 7.0 can transfer data to and from multiple backup devices concurrently. As a result, multiple servers can simultaneously send data to multiple backup devices.
- **Distributed Database Management Server.** NovaNet tracks and stores data about backup jobs, files, and tapes in its storage management database. NovaNet 7.0 also allows you to designate any network station as the database management server, regardless of the network station's location or operating system.
- **Enterprise Edition.** NovaNet 7.0 works with any combination of NetWare, Windows 95, Windows NT, and DOS.
- **Multiple Stream Processing.** NovaNet 7.0 can process an unlimited number of



NovaStor's NovaNet 7.0

data streams simultaneously, with a maximum of eight data streams per backup device.

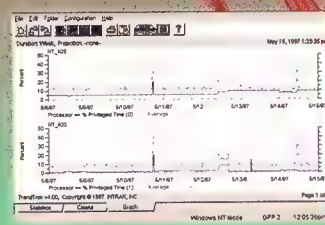
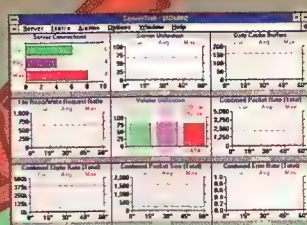
- **Parallel Data Streams.** NovaNet interleaves files at the block level (as opposed to the file level). Interleaving files at the block level reduces network overhead, resulting in faster, more efficient data transfer rates.

You can download a demonstration copy of NovaNet 7.0 from NovaStor's web site (<http://www.novastor.com/download>).

For more information about NovaNet 7.0, visit <http://novanet.novastor.com> or call 1-800-NovaStor. If you live outside the United States or Canada, you can call 1-805-579-6700 or visit http://www.novastor.com/novanet/info/intl_resellers.html to find the NovaStor office nearest you. ☎

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Protecting the Network From Virus Attacks

Mickey Applebaum

Editor's Note: "Technically Speaking" answers your technical questions, focusing on network management issues. To submit a question for a column in a future issue, please send an e-mail message to nwc-editors@nwconnection.com, or send a fax to 1-801-228-4576.

Network administrators frequently ask two questions about viruses:

- What is the best way to protect a network from virus attacks?
- What is the best virus-protection software for servers?

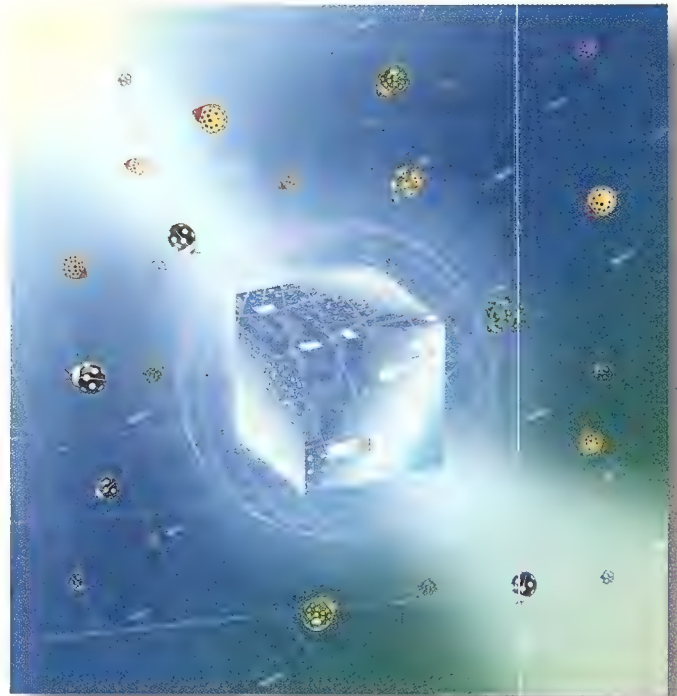
The purpose of virus protection is to maintain data integrity by preventing outside agents from accessing and modifying that data. Because a network has many different components, there are several entry points for viruses to attack the network. This article describes how to protect your company's network from virus attacks, explaining how to identify points of entry and implement appropriate protection.

ALL EYES ARE NOT ON THE SERVER

There are many misconceptions about virus attacks. The first misconception is that the server is the primary target for virus attacks on a network. Although a lot of virus-protection software play off this misconception, it is still just that—a misconception.

You must protect your company's network against two types of viruses: file viruses, which attach themselves to binary code (such as application files), and boot sector viruses, which attach themselves to executable code. Viruses are spread when a user opens or runs an infected file on a computer.

A virus cannot be spread if the user cannot run the infected file directly on the computer. As a result, the NetWare server console is secure from virus attacks because you cannot run an infected DOS or Windows 95 application on the NetWare console. The same is true of viruses that are written to infect Macintosh or UNIX workstations. Because you cannot run Macintosh or UNIX programs on the server console, such viruses cannot attack the server itself.



However, the server console becomes vulnerable when you reboot it: Before NetWare is loaded, you can access DOS on the server. At this point, you could insert an infected diskette into the server's diskette drive and unknowingly run an infected file.

Infecting the server at this level can cause problems when you copy files (such as updated versions of the SERVER.EXE file or LAN or disk drivers) to the DOS partition. This virus infection might also cause RAM integrity problems when NetWare is running and you are performing DOS access operations on the server's A or C drive. For example, updating drivers from the server console or installing new services on the server could cause RAM integrity problems.

To protect the server console when it is in DOS mode, you should install a DOS virus-protection utility on the server's DOS partition (C drive) and run this utility whenever you need to perform any operations (such as copying files) on the server's C drive. However, you should not leave the DOS virus-protection utility in memory when NetWare is running. Since you will not be using this utility when NetWare is running, you can free up server resources.

You should also install server-based virus-protection software. Several companies such as Network Associates, Symantec Corp., and Computer Associates Inc. offer this software, which allows you to check every read and write operation made on the server. (Network Associates Inc. was formed by the merger of McAfee Associates, Network General, and Dr. Solomon's Software.)

For most networks, you can configure the server-based virus-protection software to perform scheduled checks on the volumes mounted on the server. As the next section explains, most



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viruses enter the network through workstations, and checking each read and write operation on the server may not detect viruses introduced on workstations.

By running scheduled checks on the server, you provide adequate protection for the server and improve the performance of the server. You can also schedule the check to coincide with other disk operations such as the backup.

VIRUSES SNEAK ONTO THE NETWORK THROUGH WORKSTATIONS

The second misconception about viruses is that if you run virus-protection software on the server, your company's network is secure. Although that particular server may be protected from viruses, the entire network is not secure. You must protect the network at the point of attack—the point at which the virus has the greatest potential for entry to the network.

The most vulnerable part of your company's network is the workstations. If you run virus-protection software at the point of entry—in this case, each workstation—a virus cannot attack the local drives on the workstation, and a virus-infected file cannot be transferred to another workstation on the network.

By providing virus-protection software at the workstation level, you are providing the highest level of security against attack. The following examples show the importance of running virus-protection software on each workstation.

The Danger of Unprotected Workstations

Suppose a network administrator installed virus-protection software only on the server. By configuring this software to scan all read and write operations in real-time, the network administrator was confident that his company's network was protected against virus attacks.

Now suppose a user downloaded a file from the Internet onto a diskette in his workstation's A drive. The user then ran the file to install a utility on his workstation's C drive and made copies of the diskette to give to other users.

The user's workstation would be infected as soon as he ran the file he downloaded. The virus would quickly and easily spread to all of the files on his C drive. Of course, all of the users who ran the same file would also infect their C drives.

Since no read or write operations were made on the server, the virus-protection software running on the server never had the chance to check the infected files. As a result, the company would have a full-blown virus infection and no way to stop it. Worse, the network administrator might not be notified that a problem existed until users began experiencing serious problems on their workstations.

The Safety of Protected Workstations

Suppose that the network administrator had installed virus-protection software on the workstations as well as on the server. Also suppose the network administrator had configured the virus-protection software to check all read and write operations to all local drives (including floppy diskette, ZIP, JAZ, or CD-ROM drives). If a user downloaded a file from the Internet and saved this file to the A drive, the virus-protection software would alert the user that a virus was found in the file.

Now suppose a user brought a diskette from home and inserted the diskette into her workstation. When this user attempted the first file read, the virus-protection software would alert the user that a virus had been detected.

Bells and Whistles for Virus-Protection Software

Some virus-protection software may be NetWare-aware and include a server component. In this case, you can configure the virus-protection software running on the workstations to send an alert to you or another network administrator when a virus is detected. You will then know when a user is trying to save or run an infected file.

Because more and more users are accessing the Internet, many virus-protection manufacturers are releasing Internet virus-checking programs that actually read the data stream being downloaded. (The programs read the data stream whether the user is using a modem or LAN connection.) As soon as an Internet virus-checking program detects a virus signature in the data stream, this program aborts the download and sends the user an alert. The virus never even makes it to the user's workstation.

Virus-protection manufacturers are also providing safeguards to prevent

users from disabling virus-protection software. You can configure the virus-protection software so that a workstation cannot connect to the network if this software is disabled or uninstalled.

You can use this feature to ensure that all workstations are protected and cannot spread infected files. Although implementing this feature involves more configuration time upfront, it reduces the network's exposure to virus infection.

If the virus-protection software you are using on the server and workstations is from the same manufacturer, another feature may be available: You may be able to configure the virus-protection software to send an alert to you or another network administrator if a user attempts to log in to the network from a workstation that does not have virus-protection software.

E-MAIL MESSAGES CAN BE VIRUS CARRIERS

Another common misconception is that e-mail messages themselves can contain viruses. Many e-mail messages contain dire warnings about e-mail viruses. According to these warnings, simply opening an e-mail message that has a certain subject line (such as "You Are A Winner") will destroy your entire hard drive.

If you receive an e-mail message warning you about opening a certain e-mail message, don't be alarmed. You cannot get a virus simply by opening an e-mail message. The e-mail message that contains the warning is a virus hoax, making you worry about events that cannot happen. (For more information about virus hoaxes, see the related article on p. 34.)

Although you cannot get a virus via an e-mail message itself, you can receive an infected file as an attachment to an e-mail message. To protect your company's network from being infected by a file that is sent as an attachment, you should ask users to follow these simple rules:

- *Never* open a file that is attached to an unsolicited e-mail message from an unknown sender. If you don't know who sent the file or if you did not explicitly request the file be sent to you, you should simply delete the e-mail message. Do not open or download the attachment.

- Never open an attached file directly into an application, such as Microsoft Word. The Concept virus (a Word macro virus) spread quickly because many users had configured their e-mail application to automatically open .DOC files in Word. You should configure your e-mail application to prompt you before opening an attached file.
- Open an attached file on a removable media device first. By opening files on a floppy diskette, ZIP, or JAZ drive, you can properly scan the file for viruses. You are also less likely to infect other files on your workstation's hard drive.
- Immediately after opening a file, run a virus check on the file. Although virus-protection software runs background checks, you should not rely on these background checks to test all files written from e-mail attachments.
- Do not run any file you receive via e-mail until you have run a complete virus check on the file.
- Install virus-protection software on every workstation attached to the network. You should configure this software to check every read and write operation to all drives, including removable media drives (floppy diskette, ZIP, JAZ, and CD-ROM drives).
- If your company uses the Internet frequently, you should consider purchasing an Internet virus-checking program. Some of these programs are add-ons to firewall products, and some of these programs are stand-alone gateways that sit between the router to the Internet and your company's network.
- If your company receives a lot of e-mail messages that contain attachments, you should consider purchasing an e-mail virus-checking program.
- You should teach users how to manually check files for viruses. You should also implement a company-wide policy that provides guidelines for bringing files from home, down-

loading files from the Internet, and distributing these files. This policy should, at the very least, make users responsible for performing a manual virus check on each file and diskette.

You can find more information about virus protection and virus-protection software at the following World-Wide Web sites:

- Network Associates' web site at <http://www.nai.com/vinfo> or <http://www.nai.com/products/antivirus>
- Dr. Solomon's web site at <http://www.dr Solomon.com/home/home.cfm>
- Computer Associates' web site at <http://www.cheyenne.com/virusinfo> or <http://www.cheyenne.com/security>
- Symantec's web site at <http://www.symantec.com/nav>

Mickey Applebaum has worked with NetWare for more than 14 years. Mickey provides technical support on the Internet for The Forums (<http://theforums.com>).

Because e-mail attachments can be infected with viruses, some e-mail manufacturers and virus-protection manufacturers now offer e-mail virus-checking software. This software actually runs on the e-mail server and checks all e-mail messages (including attachments) being sent and received for viruses. E-mail virus-checking software can notify you of infected attachments before the intended recipient even has a chance to open the infected file.

CONCLUSION

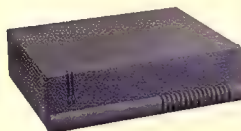
To protect your company's network against viruses, you need to evaluate the entire network and provide the appropriate type of protection at each point of entry to the network. When creating a virus-protection plan for your company's network, follow these simple steps:

- Configure the virus-protection software running on the server to perform regularly scheduled checks on all mounted volumes on the server.
- Install a virus-checking utility on the DOS partition of the server. If you down the server and perform maintenance tasks at the DOS prompt before NetWare is loaded, you could introduce viruses on the C drive.

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NetWare 5

Novell is now shipping NetWare 5, the latest version of Novell's industry-leading network operating system. NetWare 5, which is based on open Internet standards, provides pure IP support. As a result, you can easily and securely manage applications across diverse platforms and across the Internet.

You can purchase NetWare 5 from a Novell authorized reseller. If your company is running an earlier version of NetWare, you can take advantage of upgrade pricing.

For more information about NetWare 5, visit Novell's WorldWide Web site (<http://www.novell.com/netware5>). (See also "NetWare 5: Novell Returns to Its Roots," *NetWare Connection*, Sept. 1998, pp. 6-11. You can download this article from <http://www.nwconnection.com/sep.98/ntware98>.) You can also call 1-888-321-4272 or 1-801-228-4272.

NDS for NT 2.0

Novell recently released the open beta version of Novell Directory Services (NDS) for NT 2.0. NDS for NT 2.0 eliminates many problems associated with managing Windows NT servers in a NetWare environment. In addition, NDS for NT 2.0 also simplifies the process of managing Windows NT domains. For example, NDS for NT 2.0 allows you to create NDS objects for Windows NT domains and to manage these objects in the same way as you manage other NDS objects. You can also manage Windows NT users and groups by using Novell's NetWare Administrator (NWADMIN) utility or Microsoft's User Manager utility.

With NDS for NT 2.0, you can use your company's network to launch any application that requires a Windows NT server or a Windows NT domain. NDS for NT 2.0 supports all versions of NetWare and Windows NT, including NetWare 5.

You can download the open beta version of NDS for NT 2.0 free from <http://www.support.novell.com/beta/public>. For more information about NDS for NT 2.0, visit Novell's web site (<http://www.novell.com/products/nds/nds4nt>). You can also call 1-888-321-4272 or 1-801-228-4272.

GroupWise 5.5

Novell is now shipping GroupWise 5.5, a collaboration solution that allows you to easily gather, access, and exchange information across your company's network or the Internet. GroupWise 5.5, which is year-2000 ready, provides expanded document management, calendaring, scheduling, and Internet publishing capabilities. In addition, GroupWise 5.5 provides increased flexibility. For example, you can use GroupWise 5.5 to connect telephones, pagers, personal digital assistants (PDAs), and other collaboration systems on your company's network.

GroupWise 5.5 server software runs on a NetWare 5, NetWare 4, NetWare 3, or Windows NT server. GroupWise 5.5 client software runs on a Windows NT, Windows 98, Windows 95, or Macintosh workstation.

You can purchase GroupWise 5.5 from a Novell authorized reseller. If you are migrating to GroupWise 5.5 from another collaboration platform, you can take advantage of special discounts and migration packages.

For more information about GroupWise 5.5, visit Novell's web site (<http://www.novell.com/groupwise>). You can also call 1-888-321-4272 or 1-801-228-4272.

Z.E.N.works 1.1 and Check 2000

Novell recently announced that Zero Effort Networks (Z.E.N.works) 1.1, which is scheduled for release later this year, will include a five-user version of Check 2000 Client Server, a year-2000 risk assessment product from Greenwich Mean Time. (Novell will also offer a standalone version of Check 2000 Client Server to customers who do not use Z.E.N.works 1.1.) With Z.E.N.works 1.1 and Check 2000 Client Server, you can efficiently deploy year 2000-ready products across your company's network, and you can help protect this network from the millennium bug. (For more information about protecting your company's network against the millennium bug, see "Exterminating the Millennium Bug Before It Wreaks Havoc on Your Company's Network," *NetWare Connection*, June 1998, pp. 8-20. You can download this article from <http://www.nwconnection.com/jun.98/yr200068>.)

Novell's Z.E.N.works 1.1 is a directory-based desktop management tool that simplifies the process of accessing and managing network resources. For example, you could use Z.E.N.works 1.1 to distribute year 2000-ready applications to every desktop on your company's network, and you could then use NDS to prevent unauthorized users from accessing these applications. Z.E.N.works 1.1 also provides pure IP support, a simplified GUI, and remote management capabilities that you can use to manage Z.E.N.works clients from a central ManageWise console.

Greenwich Mean Time's Check 2000 Client Server is a diagnostic and corrective toolset that scans hardware, software, and data for the millennium bug. If a problem exists, Check 2000 Client Server alerts you of this problem. When used in conjunction with Z.E.N.works 1.1, Check 2000 Client Server allows you to continually monitor the year-2000 status of your company's network.

For more information about Z.E.N.works 1.1, visit Novell's web site (<http://www.novell.com/products/nds/zenworks>). You can also call 1-888-321-4272 or 1-801-228-4272. For more information about Check 2000 Client Server, visit Greenwich Mean Time's web site (<http://www.gmt-2000.com/ck2000cs.htm>). You can also call +44 (0) 1243 787468. ●

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Can I Help You?

Exploring Your Technical Support Options

Patrick Khoo

Not long ago, my company's GroupWise 5.2 server stopped working for no apparent reason. After a long and frustrating struggle trying to solve the problem, we sought help. The solution was simple: We needed to increase the amount of available RAM and move GroupWise 5.2 to a newer, faster server. After we made these changes, GroupWise 5.2 was up and running again, problem free.

Fortunately, finding help for NetWare and other Novell products is easy. The biggest challenge often lies in deciding which of the many resources to consult.

ASK A SPECIALIST

Regardless of where you live or what your networking problem is, the first resource you should turn to is a Novell authorized reseller or a systems integrator. Most resellers and systems integrators have trained technicians, CNEs, and Master CNEs who can answer your questions and help solve problems. Resellers and systems integrators may also be able to provide you with on-site or remote technical assistance.

Although most resellers and systems integrators can provide a high level of service and technical support, some resellers or systems integrators may not be thoroughly trained to support all Novell products. When choosing a reseller or systems integrator, you should ask which products each one supports and ask for references.

ASK NOVELL

If your reseller or systems integrator cannot answer your networking question, your next resource should be Novell's technical support group, which consists of a worldwide network of personnel who are dedicated to helping you solve your networking problems. For the southeast Asian region (where I live), the primary technical support center is located in Australia. A highly capable support staff is based in Singapore's local Novell office as well. A networking issue that originates in Singapore may be solved by Novell's support personnel in Singapore, Australia, or anywhere else in the world.

To find the Novell support center nearest you, visit Novell's web site (<http://support.novell.com/misc/worldwide.htm>).

ASK YOUR NETWORK USER GROUP

If you enjoy the challenge of solving your own networking dilemmas, you can turn to your local NetWare user group. Mem-

bership in a NetWare user group provides many benefits. For example, if you were a member of the NetWare User Group Singapore (NUGSIN), you could contact NUGSIN members through e-mail. Chances are good that someone in the group has had a question similar to yours, and he or she may have already discovered a quick solution to your problem.

When you join a NetWare user group such as NUGSIN, you also have access to technical seminars and product previews. For example, before NetWare 5 was released, NUGSIN organized a special NetWare 5 technical seminar. Events such as these give you early access to information that can help you solve a current networking problem or even prevent a future problem.

To find the user group nearest you, see the list on pp. 45-47 or visit NetWare Users International's World-Wide Web site at <http://www.novell.com/nui/groups>. You can visit NUGSIN's web site at <http://www.nugsin.org.sg>.

ANSWERS ONLINE

Finally, you can turn to the Internet for an abundance of online technical support sources. Because you are using NetWare or other Novell products, the most important web site is the Novell Support Connection (<http://support.novell.com>). This web site contains the minimum patch list, from which you can download all of Novell's latest patches and updates (<http://support.novell.com/misc/patlst.htm>). From this web site, you can also search Novell's KnowledgeBase (http://support.novell.com/search/kb_index.htm) for Technical Information Documents (TIDs). TIDs can help answer your technical questions, and they often contain links to downloadable software files, patches, and drivers.

Another place to find answers to your questions is Novell's Support Forums (<http://support.novell.com/pforum>). From this site, you can interact online with NetWare users worldwide. In addition, Novell system operators regularly review the forums and answer questions.

With so many resources, your most difficult problem may be deciding which resource to use first when you are faced with a networking problem. Whatever your problem, and whether you live in Singapore or Provo, Utah, help is always just around the corner.

Patrick Khoo is the editor-in-chief for a monthly magazine in Singapore. He is also a Certified Novell Administrator (CNA) and a CNE.

NUI USER GROUPS WORLDWIDE



NetWare Users International

NetWare Users International (NUI) is an association designed to support Novell networking professionals. NUI members represent all facets of the networking industry, including network administrators, IS managers, systems integrators, CNEs, Master CNEs, and Certified Novell Administrators (CNAs).

NETWARE USER GROUPS

Each NetWare user group is designed to meet local needs. Some of the benefits of membership in a NetWare user group are listed below:

- Product demonstrations from Novell and other vendors
- Newsletters that provide tips and tricks for managing your company's network
- A World-Wide Web site to keep you informed on what is happening in your local group

- A software library containing Novell products and technologies and the Novell Support Connection CD—a comprehensive library of support resources from Novell
- Contact with other networking professionals

Although not all benefits are available in all user groups, you will find the user group in your area a valuable resource.

The following list contains contact information for NetWare user groups worldwide. If you can't find a NetWare user group in your area, visit NUI's web site (<http://www.novell.com/nui/groups>). You can also call 1-800-228-4684 or 1-801-228-4500, or fax 1-801-228-4577.

All numbers outside the U.S. or Canada are listed with their city codes. Please contact your local long-distance carrier for the current country codes. •

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Adelaide Christian Legg
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Melbourne Marc Heymann
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+11-3138-7204

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+2-207-2673

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Peterborough Paul Gardner
+1733-211-212

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818-756-6326

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San Diego Jim Fry
619-546-2810

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510-258-0204

San Jose/Silicon Valley Allan Hurst
650-525-4567

San Ramon Vince Montgomery
925-456-9980

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Fort Collins Patty Joseph
970-350-9295

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Fairfield County Jay Ferron
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609-478-0025

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Honolulu Brian Chee
808-541-1924

Idaho

Idaho Falls James Acevedo
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Moscow James M. Cassetto
208-885-6492

Twin Falls John Stevens
208-423-6519

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217-337-5558

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630-810-9029

La Salle Thomas J. Martini
815-434-3081, ext. 233

Peoria Brian Milbrandt
309-637-8446

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Michigan		Capital District	Scott Brennan 518-237-9994	South Carolina		Seattle	William Higgins 206-789-8343		
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Magazines on the Web

Matthew Jones

As the staff of *NetWare Connection* could tell you, publishing a print magazine can be extremely expensive and time consuming. The Internet, however, has presented a new opportunity for would-be publishers: online magazines. With a World-Wide Web site, some web publishing tools, and a few writers and editors, companies can now create an online magazine, taking advantage of this cost-effective alternative to print magazines.

The online magazines mentioned in this article feature technical information about the latest products and technologies. Unlike many print magazines, these online magazines do not require you to purchase a subscription.

After you have read a few articles, you might want to check out this month's network resources and games. You can also read about the new products I have found. (See "Product Snapshots.")

WORLD-WIDE WEB SITES

Although *NetWare Connection* isn't available only on the Internet, I thought I should mention that the *NetWare Connection* web site has moved to <http://www.nwconnection.com>. This web site not only has a new URL, but it also has a new look and several new features:

- **Enhanced Online Subscription Form.** If you subscribe to the print version of *NetWare Connection*, you should receive a notification in the mail once a year, reminding you that it's time to renew your subscription. Instead of mailing or faxing a subscription card each year, you can complete the online subscription form. You can also complete this form to receive a new subscription or to change your address.
- If you live in the United States or Canada, you can receive a free subscription to the print version of *NetWare Connection*. If you live outside the United States or Canada, the cost is U.S. \$24 for one year, U.S. \$45 for two years, or U.S. \$65 for three years to cover shipping costs. You can now purchase a subscription online by securely submitting your credit card information over the Internet.
- **Enhanced Online Bookstore.** The *NetWare Connection* Bookstore has added shopping cart technology, which allows you to purchase products online by securely submitting your credit card information over the Internet. The *NetWare Connection* Bookstore regularly features new products. You can purchase these products at 20 to 30 percent off the retail price. You can also find Novell advanced technical training videos, third-party technical training videos, and CD-ROMs.
- **Advertiser Information.** If you want more information about any of the products or services advertised in the print version of *NetWare Connection*, you can take advantage of hypertext links to each advertiser's web site. You can also find advertiser information by clicking the banner ads that appear on the *NetWare Connection* web site, and you can find contact infor-

mation for some of the Novell authorized education centers (NAECs) located throughout the United States and Canada.

- **Search Engine.** The *NetWare Connection* web site continues to offer past issues online, but locating articles is easier than ever: You can use the new search engine to find a specific article or to find articles about a particular subject. You no longer have to manually search every past issue to locate the articles you need.
- **Utility Database.** You can download shareware and freeware utilities from the *NetWare Connection* web site. These utilities are now stored in a database, so you can access them quickly and easily. You can also use this database to submit utilities that you want to see added to the *NetWare Connection* web site.
- **Tips and Tricks.** If you are interested in finding out how to perform new networking tasks, to troubleshoot networking problems, or to avoid these problems altogether, you need to check out the tips and tricks that have been added to the *NetWare Connection* web site. Because these tips and tricks change daily, you can learn something new every day.

After you explore these new features on the *NetWare Connection* web site, you might want to visit *Win98 Magazine* (<http://www.win98mag.com>). This online magazine, which is published every two months, is an excellent resource if you have recently upgraded, or are considering upgrading, to Windows 98. You can read articles about installing and managing Windows 98 as well as articles about using the new features of Windows 98.

Even if you are using Windows NT or Windows 95, you can find useful information in *Win98 Magazine*. For example, before Windows 98 was released, this online magazine was called *Win95 Magazine*, and you can access past issues of *Win95 Magazine*. You can also download shareware and freeware utilities for Windows NT, Windows 98, and Windows 95. In addition, you can view tips and tricks, purchase books online, and participate in several forums that allow you to exchange Windows-related information with other users.

JavaWorld (<http://www.javaworld.com>) is a monthly online magazine that focuses on Sun Microsystems' Java programming language. Whether you are a developer or a network administrator, you can find useful information in *JavaWorld*. You can read articles from the current issue or past issues, and you can sign up to receive an e-mail message when new articles are published.

You can also view tips and tricks and a list of upcoming Java events, training courses, and seminars. You can even download tools that help you develop and manage Java products.

NETWORK RESOURCES

Because the Internet changes so quickly, keeping up with the latest terminology is nearly impossible. If you encounter an acronym that you can't decipher, visit *NetLingo* (<http://www.netlingo.com>), an online dictionary that specializes in Internet

Product Snapshots

When I am looking for the latest games, I often find new and interesting products. Product Snapshots gives you a quick overview of the most useful products I have found during the past month. (Please note that these are first-look reviews.)

MONSTER 3D II

Monster 3D II from Diamond Multimedia is a PCI-based graphics upgrade board that allows you to take advantage of the latest 3-D technology without replacing your existing graphics board. Monster 3D II works with the 2-D or 3-D graphics board you already have installed, improving 3-D throughput.

Monster 3D II uses the Voodoo2 3Dfx controller, which provides excellent 3-D capabilities for any game that uses the Glide, Direct3D, and Mini GL graphics standards. With this controller, Monster 3D II generates more than 60 frames per second during game play and offers three separate 3-D engines that enhance both the performance and the appearance of graphics.

Monster 3D II includes two ports: a VGA-IN port and a VGA-OUT port. In addition, Monster 3D II includes a pass-through cable that you can use to connect your existing graphics board to Monster 3D II, which you can then connect to your monitor.

You can purchase Monster 3D II through retail channels in two configurations: one with 8 MB of memory and one with 12 MB of memory. The suggested retail price is U.S. \$229 and U.S. \$279, respectively. For more information about Monster 3D II, visit

Diamond Multimedia's web site (<http://www.diamondmm.com>). You can also call 1-800-468-5846 or 1-408-325-7000.

COPEASE

CopEase is a file management utility from Vinca Corp. CopEase, which supports NetWare 3.12, NetWare 4, intraNetWare, and NetWare 5 allows you to access files stored on both the DOS partition and the NetWare partition from the server console.

If you install CopEase on only one server, you can move files between the DOS partition and the NetWare partition. You can also copy and delete files and directories, set file attributes, create directories, and view directory listings. In addition, you can analyze a particular NetWare Loadable Module (NLM), viewing a list of other NLMs that must be loaded to run this NLM and searching the server for the necessary NLMs.

If you install CopEase on multiple servers, you can access advanced features as well. For example, you can copy files and directories between the DOS partition and the NetWare partition across servers, and you can update files across servers. CopEase is especially useful for updating patches and drivers.

To prevent unauthorized users from performing tasks offered by CopEase, you can assign a password for each task. A user must then enter the correct password to perform a particular task.

You can purchase CopEase through retail channels at the suggested retail price of U.S. \$149. For more information about CopEase, visit Vinca's web site (<http://www.vinca.com>). You can also call 1-888-808-4622 or 1-801-223-3100. ●

technologies. You can look up a word, browse a list of words, or add a word to the database. In addition, you can also launch a "pocket dictionary" that appears in a separate window in your web browser. You can then refer to this dictionary if you read an unfamiliar word as you surf the Internet. You can even find a complete list of *emoticons*, which are symbols that users often enter in e-mail messages or chat rooms to express their feelings. :)

If you can't find what you need in NetLingo, turn to PC Webopaedia (<http://www.pcwebopaedia.com>). Like NetLingo, PC Webopaedia offers the ability to look up a word and to add a word to the database. Rather than providing basic definitions, however, PC Webopaedia offers more in-depth entries. For example, if you looked up *firewall*, you would not only learn what a firewall is, but you would also learn about each type of firewall and find a list of hypertext links to web sites that discuss firewalls.

NETWORK GAMES OF THE MONTH

Because more games are being created with networking capabilities, both of this month's games are network games. If you want to recommend a standalone game for

review, please send an e-mail message to matthew@netfire.com.

MechCommander

MechCommander from Microprose and FASA Interactive is a strategy game similar to the popular games Command & Conquer and Warcraft. As the game begins, you assume the role of a Mech commander on a planet called Port Arthur, which is under attack by the rival Smoke Jaguar Clan. Your mission is to reclaim your lost territory by defeating this technologically superior enemy. To do so, you must send your raw recruits into battle, and you must organize the entire unit, managing combat supplies, vehicle repairs, and weapons upgrades.

MechCommander supports Windows 95 and Windows 98. You can play MechCommander with up to five other people over a network connection. You can also play MechCommander against one other person over a modem or the Internet.

You can download a demonstration version from <http://www.mechcommander.com/info/download.html>, and you can purchase MechCommander through retail channels at the suggested retail price of U.S. \$49. For more information, visit the

MechCommander web site (<http://www.mechcommander.com>). You can also call 1-510-864-4550.

Rainbow Six

Rainbow Six from Red Storm Entertainment is based on the best-selling book of the same name by Tom Clancy. In the game, you lead a multinational task force that is responsible for eliminating terrorism throughout the world. You direct a series of assaults on terrorist installations, gradually uncovering a sinister conspiracy of catastrophic proportions. You must then save the world by finding out as many details as you can so you can stop the conspiracy. No pressure, but the game's slogan is "Play as if 5.7 billion lives depended on it."

Rainbow Six supports Windows 98 and Windows 95. You can play Rainbow Six with up to 15 other people over a network or Internet connection.

You can purchase Rainbow Six through retail channels at the suggested retail price of U.S. \$39.99. For more information, visit Red Storm Entertainment's web site (<http://www.redstorm.com>) or call 1-919-460-1776.

Matthew Jones works for Waterstone Consulting in Chicago, Illinois. ●

Your Source for Classic Networking Literature

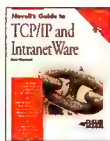


**20% Off
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LearnKey's intra-NetWare 4.11 Bundle

10 videos
ISBN: 290692
Retail Price: \$789.00
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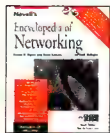
Novell's Guide to TCP/IP and IntraNetWare

Drew Heywood
788pp ISBN: 45329
Retail Price: \$49.99
Our Price: \$39.99



Novell's Guide to Creating IntraNetWare Intranets

Karanjit Siyan
777pp ISBN: 45310
Retail Price: \$39.99
Our Price: \$31.99



Novell's Encyclopedia of Networking

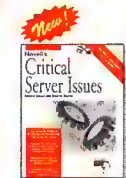
Kevin Shafer
1,192pp ISBN: 45116
Retail Price: \$69.99
Our Price: \$48.99



LearnKey's NetWare 5.0 Migration

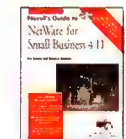
Kent Erickson and James Swartz
3 videos ISBN: 290899
Retail price: \$249.95
Our Price: 199.95

This set of three videos provides training for CNEs who plan to migrate to NetWare 5.0 from NetWare 3.x, 4.x, or 4.11 systems. These videos contain detailed instructions to ensure successful NetWare 5.0 migration.



Novell's Guide to Resolving Critical Server Issues

Richard Jensen and Brad W. Dayley
600pp ISBN: 45507
Retail Price: \$59.99
Our Price: \$47.99



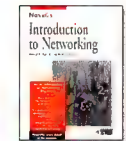
Novell's Guide to NetWare for Small Business 4.11

Eric Harper and David L. Gardner
408pp ISBN: 45043
Retail Price: \$34.99
Our Price: \$27.99



Novell's Certified Internet Business Strategist Study Guide

Jim Bowman
456pp ISBN: 45493
Retail Price: \$39.99
Our Price: \$31.99



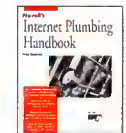
Novell's Introduction to Networking

Cheryl C. Currid
328pp ISBN: 45256
Retail Price: \$19.99
Our Price: \$13.99



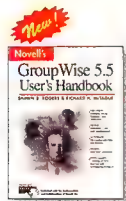
Novell's Guide to BorderManager

J.D. Marymee and Sandy Stevens
350pp ISBN: 4540X
Retail Price: \$49.99
Our Price: \$39.99



Novell's Internet Plumbing Handbook

Peter Rybaczyk
311pp ISBN: 4537X
Retail Price: \$34.99
Our Price: \$24.49



Novell's GroupWise 5.5 User's Handbook

Shawn B. Rogers and Richard H. McTague
300pp ISBN: 45523
Retail Price: \$24.99
Our Price: \$19.99

This reference discusses all the new features of GroupWise 5.5, such as Workflow Manager, Workflow Professional, GroupWise Imaging, and GroupWise Publisher. Also included are task-oriented chapters, screenshots, tables, and tips.



Novell's Certified Web Designer Study Guide

Jim Bowman
600pp ISBN: 45485
Retail Price: \$49.99
Our Price: \$39.99



Novell's CNE Study Set for IntraNetWare/NetWare 4.11

David James Clarke, IV
2,532pp ISBN: 45337
Retail Price: \$148.99
Our Price: \$104.29



Novell's Dictionary of Networking

Kevin Shafer
640pp ISBN: 45280
Retail Price: \$24.99
Our Price: \$19.99



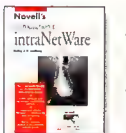
Novell's Guide to LAN/WAN Analysis: IPX/SPX

Laura A. Chappell
874pp ISBN: 45086
Retail Price: \$59.99
Our Price: \$47.99



Novell's GroupWise 5 User's Handbook

Shawn B. Rogers and Richard H. McTague
260pp ISBN: 45094
Retail Price: \$24.99
Our Price: \$19.99



Novell's Introduction to IntraNetWare

Kelley J.P. Lindberg
416pp ISBN: 45302
Retail Price: \$39.99
Our Price: \$31.99



How To 2000

Raytheon Systems
656pp ISBN: 31018
Retail Price: \$49.99
Our Price: \$39.99

This book tackles the year 2000 issue from all sides. It contains a complete description of compliance phases, standards for tracking progress, quality-assurance guidelines, project monitoring, problem definition, and a full review of third-party tools.



HTML 4 Bible

Bryan Pfaffenberger and Alexis D. Gutzman
1030pp ISBN: 32200
Retail Price: \$49.99
Our Price: \$39.99



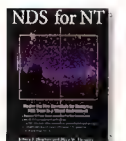
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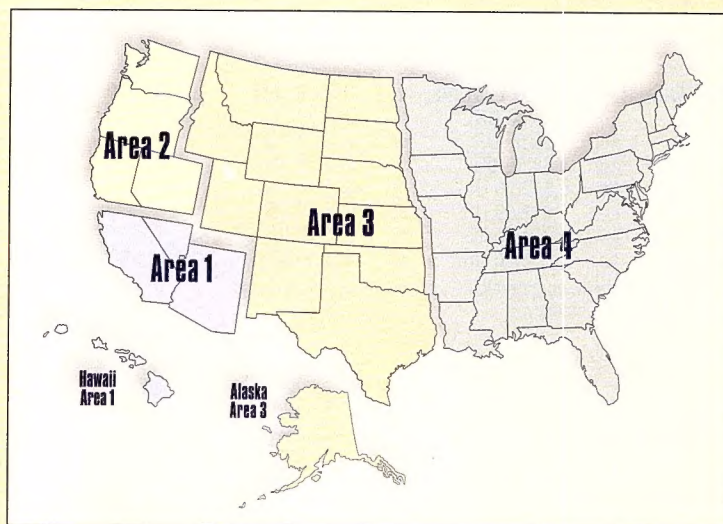
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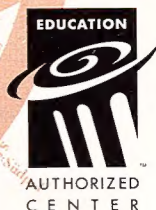
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